11 DAYS OVER THE ATLANTIC

FLYING

THE WORLD'S MOST WIDELY READ AVIATION MAGAZINE

APRIL
35 CENTS

WHAT! NO THRILLS LEFT?

A lightplane pilot gets a big charge out of flying a light twin.

★

PIONEER MECHANIC

George Hallett blazed the air trail from North Beach to Moscow.

MAR 1958
ENGINEERING

F-38-1599.5-2
GENERAL LIBRARY
UNIVERSITY OF MICHIGAN
ANN ARBOR MICH

Better performance, comfort and appearance for your business airplane!

CONVAIR 240 INTEGRAL STAIR DOOR, *an AiResearch modification, combines high efficiency with light weight and smart appearance.*

INSTALLATION OF WING TANKS *by AiResearch brings capacity to over 2000 gallons, adding extra hours to range of Convair 340 and 440. (Added fuel capacity also available for Convair 240.)*

CONVAIR 340 or 440 RADAR NOSE *is part of AiResearch conversion which includes radio, autopilot and new instrumentation.*

MAXIMUM EFFICIENCY *as an airborne office is combined with the utmost in comfort in this AiResearch custom interior conversion in a Convair 440.*

Come to AiResearch for the finest in conversion facilities, workmanship and service

The Convair conversions illustrated are typical of hundreds made on all types of business aircraft, including DC-3s, DC-6s, Lodestars and D-18s. A single visit to AiResearch Aviation Service can solve any conversion, modification or servicing problem you may have.

Here, in more than 150,000 square feet of floor space, we can install new instruments, larger engines, extra fuel tanks, the finest in radio and radar equipment and new, complete electrical and hydraulic systems. And we can provide the finest interiors custom-tailored to your individual requirements.

In addition, we can satisfy all your service needs from turn-around service to complete overhauls. You are invited to inspect our facilities. Please write or telephone for full information.

THE GARRETT CORPORATION

AiResearch Aviation Service Division

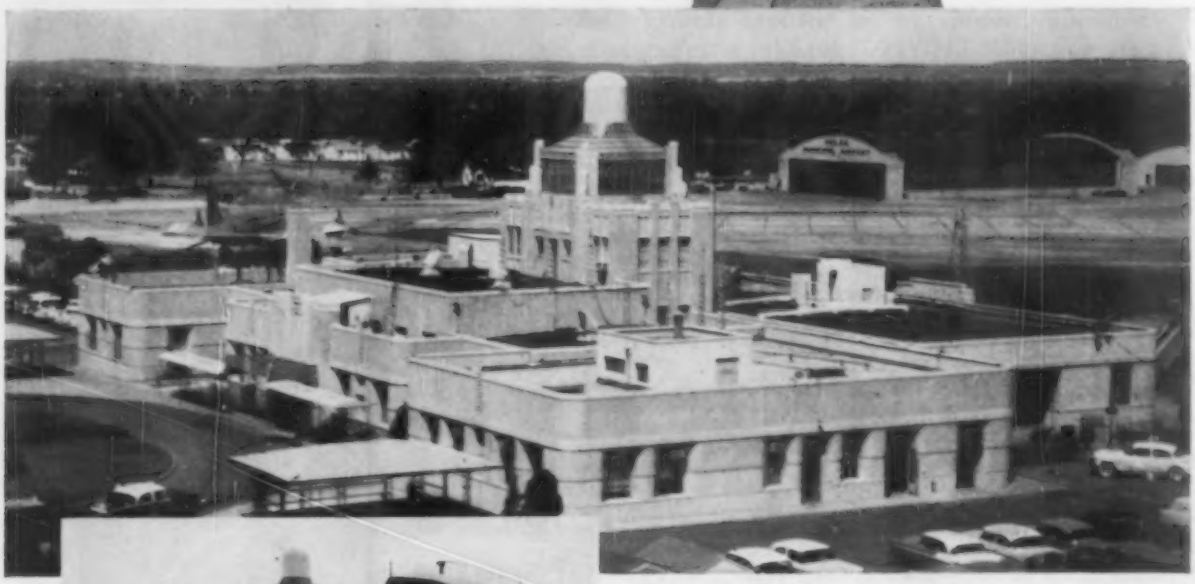
International Airport, Los Angeles, Calif. • Telephone: ORegon 8-6161

Conversion and Modification • Custom Interiors • Electrical and Instrument • Radio and Electronics • Engineering Service • Turn-Around Service

TULSA MUNICIPAL AIRPORT

The airport that oil built

Pat Combs, *manager, Tulsa Municipal Airport*



BUSY AIRPORT—The Tulsa Municipal Airport handles 200,000 aircraft movements a year—equivalent to a plane landing or taking off every three minutes. Scheduled airline service is provided by American, Braniff, Central, Continental and TWA.

Complete around-the-clock service is available to transient aircraft and the fleet of more than 250 executive-type aircraft based here.

As Pat Combs, the Tulsa Municipal Airport manager, puts it: "Tulsa has an unusually fine airport facility mainly because Oklahoma oil men recognized the value of air travel 30 years ago."

He also points out the Tulsa airport has always been progressive minded. Today it is one of the few airports in America with a runway long enough to accommodate jet planes that are now on the drawing boards. Its central location also makes it the air crossroads of the nation.

"We use Phillips Aviation Gasoline exclusively," Mr. Combs said, "in fact, we used about 4 million gallons in the year ending July, 1957. We feel that we must provide a top quality, dependable fuel for our customers; that's why it's Phillips all the way."

AVIATION DIVISION • PHILLIPS PETROLEUM COMPANY • BARTLESVILLE, OKLAHOMA

FLYING®

APRIL, 1958 VOLUME 62, NUMBER 4

CONTENTS

Editorial: The Foundation 24

11 Days Over the North Atlantic . . . . *Jack Hunt, CDR., USNR* 26

Night Owl . . . . . *Arthur L. Sparks* 31

Helicopter on Instruments—Necessary or Not? . *Thomas W. Anderson* 32

Business Flying Terminal 34

Re: An Open Letter to the Congress 36

Airman's Album 38

Pioneer Mechanic . . . . . *Bruce Reynolds* 40

What! No Thrills Left? . . . . . *Albert W. Bailey* 47

The Super Ventura—Sharp Business Tool . . . . *Alex Dawydoff* 48

Pro's Nest: Get the Most From Your Flaps . *S. W. Hubbard, Jr. and Ted Durosko* 50

Is an Ultra-light the Answer? . . . . . *Dean McCarty* 51

Have You Seen? 52

Whatever Became of . . . the Curtiss Robin? . . *Lesley N. Forden* 54

I Learned About Flying From That!, No. 218 . . . . *R. J. Holland* 56

FLYING FEATURES

Mailbox 6

Briefings 10

Hangar Flying 14

Have You Read? 20

Overnight Stop—No. 36 68

Flying Calendar 92

Photo Credits 95

Advertising Index 97

THE COVER: Ulric Meisel photographed this night scene outside Southwest Airmotive's new flying terminal at Love Field, Dallas, Tex. (See story on page 34.) Magnolia Petroleum Company's Aero Commander parks before the lobby and attractive Flight Deck dining area.

GILL ROBB WILSON
Editor and Publisher

C. L. HAMILTON
Managing Editor

ALEX DAWYDOFF
Associate Editor

DARIO POLITELLA
Associate Editor

MARJORIE M. GRAY
Associate Editor

NOVETAH DAVENPORT
Associate Editor

A. M. COURTNEY
Editorial Assistant

—

FIL GIULIANO
Art Director

—

ROBERT B. PARKE
Advertising Director

DANIEL C. MINNICK
Eastern Advertising Manager

JOHN L. FILSON
Advertising Manager, Midwest

Member of the Audit Bureau of Circulations

ABC

Ziff-Davis Publishing Company Editorial and Executive Offices
One Park Avenue, New York 16

Branch Offices: 64 E. Lake St., Chicago, Ill.
Room 412, 215 West 7th Street, Los Angeles 14, California

ZIFF-DAVIS PUBLISHING CO., One Park Avenue, New York 16, N. Y. William B. Ziff, Chairman of the Board (1946-1953); William Ziff, President; H. J. Morganroth, Vice President; W. Bradford Briggs, Vice President; Michael H. Froelich, Vice President; Michael Michaelson, Vice President and Circulation Director; Victor C. Stabile, Treasurer; Albert Gruen, Art Director.

CONTRIBUTIONS: Contributions should be mailed to the New York Editorial Office at One Park Avenue, New York 16, N. Y., and must be accompanied by return postage. Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions will be handled with reasonable care; but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptation and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

SUBSCRIPTION SERVICE: All subscription correspondence should be addressed to Circulation Dept., 64 E. Lake Street, Chicago 1, Ill. Please allow at least 4 weeks for change of address. Include your old address as well as new—enclosing if possible an address label from a recent issue of this magazine.

SUBSCRIPTION RATES: One year U. S. and possessions and Canada $4.00; Pan American Countries $4.50; all other foreign countries $5.00.

FLYING is published monthly by the Ziff-Davis Publishing Company. William B. Ziff, Chairman of the Board (1946-1953), at 64 E. Lake St., Chicago 1, Ill. Entered as second-class matter Sept. 8, 1942, at the Post Office, Chicago, Ill., under the act of March 3, 1879. Authorized by Post Office Department, Ottawa, Canada, as second class matter.

Copyright © 1958 by Ziff-Davis Publishing Company. All rights reserved.

AT LAST THE ANSWERS TO ALL YOUR AVIATION QUESTIONS IN A COMPLETE ONE-VOLUME LIBRARY

"Stands head and shoulders above anything of its kind . . . useful to all from basic CAP Cadet and private student to the airport manager and professional pilot."—*FLYING Magazine*

MODERN AIRMANSHIP

Edited by NEIL D. VAN SICKLE, Colonel, USAF, with contributions from 19 leading specialists in Air Force and civilian flying.

As up-to-the-minute as the newest jets, this unique book tells you what every airman must know about weather, aerodynamics, the structure and propulsion of his craft, the instruments and tactics of flight, instrument flying and air navigation.

The thrilling new developments in supersonic, high-performance, and jet engine flying are fully covered as well as the latest findings in aviation medicine about man in flight. There's a chapter on the increasingly important field of arctic flying and a whole section on ground services—the layout of airports, routines of airplane servicing, and the official organizations that control air traffic and administer flying.

Written by experts from the extensive resources and the vast experience of the United States Air Force, this amazing volume is a *must* for pilots, students, technicians, military personnel, flying clubs—for everyone who wants to know the very latest professional flight techniques.

844 pages, lavishly illustrated with many photographs and hundreds of helpful drawings, diagrams and charts. Extensive bibliographies and index for ready reference. $9.75

A PARTIAL LISTING OF THE TOPICS COVERED IN THIS GREAT BOOK!

See how completely every area of interest to the flier is covered!

THE ATMOSPHERE
Chemical Structure
Physical Structure
Pressure
Humidity
Temperature
Radiation

MODERN AIRCRAFT
Bombers
Fighters
Reconnaissance
Transport
Utility
Civil Aircraft
Naval Aircraft

AERODYNAMICS
Lift and Drag
Thrust and Weight
Force Vectors
Newton's Laws
Load Factors
Airfoils
Supersonic Aerodynamics
Mach Cone
Shock Waves
Ailerons
Rudders
Elevators

AIRPLANE STRUCTURES
Stress and Strain
Fuselage
Wings
Stabilizers
Control Surfaces
Engine Mounts
Landing Gear
Steering
Brakes
Corrosion

AIRCRAFT PROPULSION
Propellers
Efficiency
Take-Off Performance
Reciprocating Engines
Fuels
Horsepower Control
Superchargers
Performance Charts
Engine Cooling
Carburetion
Radial Engines
Turbojets
Turboprops
Ramjet and Pulsejets
Rocket Motors
Propellants

AIRCRAFT INSTRUMENTS
(Up-to-date information on all flight instruments and operational equipment)

MAN IN FLIGHT
Decompression Sickness
Pressurized Cabins
Emergency Equipment
Vision in Flight
Aerial Equilibration
Airsickness

BASIC FLIGHT TECHNIQUES
Elementary Skills
Straight and Level Flight
Climbs and Descents
Level Turns
Coordination Maneuvers
Take-Off
The Stall
Climb Out
Spins
Dives
Approaches
Landings
Crosswinds
Advanced Maneuvers

FLYING HIGHER PERFORMANCE AIRCRAFT
(Multi-engine and jet operation, from preflight planning to landing)

WEATHER
Circulation
Wind and Pressure
Clouds
Stability
Fronts
Weather Maps
Forecasts
Icing

INSTRUMENT FLYING
(Examples of instrument procedure under all conditions and altitudes)

AIR NAVIGATION
Definitions
Projections
Dead Reckoning
Celestial Navigation
Sextants
Celestial LOP's
Pressure Pattern Flying
Minimal Flight Path
Single Heading Flying
Specialized Problems

FLIGHT CONTROL
(Military and civil boards, regulations, procedures, etc.)

HELICOPTERS
History
Sikorsky
Bell
Piasecki
Hiller
Convertiplanes
Flight and Operation
Controls
Maneuvers
Safety

SERVICING AND MAINTENANCE
(Trouble-shooting, maintenance, management, reports and records for all types of aircraft.)

THE ARCTIC PILOT
(All aspects of arctic flying.)

MODERN AIRPORTS
(Complete information on all types and classes, including heliports.)

"An airman's bible . . . the first comprehensive, authoritative work embracing all aspects of aviation."
—*AIR FORCE Magazine*

"Combining the main facts and techniques involved in everyday flying with those of supersonic flying on the threshold of outer space . . . a fast-moving reference book on modern aviation."
—*Louis Alexander, Houston Chronicle*

EXAMINE FREE FOR 10 DAYS!

Take advantage of this special offer and examine MODERN AIRMANSHIP free for 10 days. If not completely satisfied, return the book postpaid and owe nothing. Otherwise, remit full purchase price, plus a few cents postage, or buy on easy terms offered in coupon.

D. Van Nostrand Company, Inc. Dept. F48
120 Alexander Street, Princeton, N. J.

Please send me . . . . copy(ies) of MODERN AIRMANSHIP @ $9.75 each.

☐ Within 10 days, I will remit payment plus small postage, or return book and owe nothing.

☐ I want to buy on easy terms. If I decide to keep the book, I will pay $3.75 down, plus small postage, and remit $3.00 per month for two months.

NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

In Canada, order from D. Van Nostrand Company, Ltd., 25 Hollinger Road, Toronto, Canada.
SAVE! Remit with order and we pay postage. Same return guarantee.

On Course the Kane Way

KANE MARK VI DEAD RECKONING COMPUTER

NEW...

All metal computer with metal slide insert. For wind triangle solution and time, distance, fuel consumption computation. Airspeed—altitude computation accomplished directly using Fahrenheit or Centigrade. In leather case.

$15.00 list

with direction manual $3.00 list

Introductory Offer both $8.85

D-4 COMPUTER

For time, distance, ground speed, air speed and altitude computations.

New $1.00

KANE AVIGATION PLOTTER

Acclaimed the greatest advancement in plotter design. Precision engineered—simple to operate—crystal clear. Dimensions: 16 x 3 x 1/8 inches. For Sectional and WAC charts. Outer scale in statute miles, center scale nautical. With leather case and directions $3.00

CAA EXAM

PASS CAA EASY

AIDS based on the very latest CAA requirements

PRIVATE PILOT EXAM

New X-country type with charts ..... list $3.50

Special offer 1.00

COMMERCIAL PILOT EXAM

New X-country with charts $3.50

NEW ENGINE MECHANIC EXAM

With Oral and Practical, both $3.50

KANE E-6B MANUAL ..... list $3.00

reduced 1.50

ATTRACTIVE DEALER DISCOUNTS

Money back guarantee on all items

KANE AERO EQUIP'T

MANUFACTURERS AND PUBLISHERS

1845 FORD PARKWAY

ST. PAUL 16, MINNESOTA

MAILBOX

THE WALDEN STORY

It was very kind of you to send me an advance copy of the January issue of FLYING. I had learned that Dr. Walden was to be featured in this issue and was particularly pleased to get this copy so promptly. I have added your pages to our permanent file pertaining to the two scale models of the Walden monoplanes on exhibit here, and the scale model of his radio-controlled glide bomb of 1915.

We are pleased to have these examples of Dr. Walden's aviation pioneering in the National Aeronautical Collections and agree with your organization that his accomplishments deserve being better known.

PAUL EDWARD GARBER
Head Curator
Smithsonian Institution
National Air Museum
Washington 25, D. C.

The Walden story makes me go back many years to before 1909.

The heart of the real grass cutters was St. Louis, Mo., Kinlock Park and Lambert Field. In the year 1904, at St. Louis World's Fair, when Glenn Curtiss couldn't get his biplane off the ground though he tried several times one day!

We, too, in E. St. Louis, Ill., had a field before 1909 with a large wooden hangar. I became acquainted there with a Nicaraguan who had a Farnham biplane which he had built. The first Gnome 60 or 90 hp motor ever to enter the U.S. was delivered to E. St. Louis via express from France to be installed in his plane.

I left East St. Louis for New Mexico and returned in 1915 to follow Tom Benoist to Sandusky, Ohio, and flew in one of his boats on Sandusky Bay. He was killed in a street car accident in 1915, I believe.

I heard Eddie Stinson and Carl Butts had a flying school at the Curtiss hangar in Newport News, Va., so I went there to take up flying . . . in 1917 I went to England.

Would like to hear from anybody at Kinlock Park, Lambert Field, Washington Park, E. St. Louis, Sandusky, O., or Curtiss Wright at Newport News.

G. S. D. SEXTON
El Jardin Hotel
Brownsville, Tex.

ANOXIA VS HYPOXIA

Referring to "I Learned About Flying From That" in January FLYING. Isn't the correct word Hypoxia, not Anoxia? Has my Air Force Training been in vain?

MICHAEL LOYD
San Francisco 22, Calif.

I would like to comment on the use of the word Anoxia by Mr. Ringle in his hairy tale "I Learned About Flying From That." In AF pilot training (1956) and in the book "Modern Airmanship," edited by Col. Neil D. Van Sickle, a distinction is made between anoxia, as the complete lack of oxygen which results in death very rapidly, and hypoxia, as a partial lack of oxygen. Since Mr. Ringle was not unconscious at any time and he did not fly above 13,500 ft. he suffered only a partial loss of oxygen, or hypoxia, which I admit will in itself cause unconsciousness. The important thing, of course, is the insidious nature of this difficulty wherein lies its greatest danger as was pointed out in the article. All pilots should be familiar with its effects on themselves, since different persons have slightly different experiences from oxygen starvation much the same as different reactions to alcohol.

KENNETH C. WHITE
Albany, N. Y.

SOARING MEET

This letter is to call attention to a mistake in your article "Soaring Meet" in the January issue. The picture, top

right on page 40, is not George E. Coder, Jr. of Arlington, Tex., but Andrew J. Smith of Tecumseh, Mich.

PETER K. HICKMAN
Adrian, Mich.

● *We sure hit a downdraft on this one! Reader Hickman is right. It is Andrew J. Smith in his LO-150 sailplane and not George E. Coder Jr. in the Weihe. Our apologies to both gentlemen.*—ED.

SINGLE, WILL TRAVEL

Say, if you people at FLYING Magazine don't quit printing such good stories you're going to have to hire some more help to take care of the new subscribers! (And I'm looking for a job!)

Now when you got good guys like Paul Harvey writing for you you're going to have more readers ("North and North and North" in that extra-good February

(Continued on page 8)

NOW..

1,200 HOURS*

BETWEEN MAJOR
OVERHAULS FOR THE

BELL

*EQUAL TO 100,000 MILES..

FOUR TIMES AROUND THE WORLD!

Bell . . world's most experienced helicopter . . leads again! Because of its outstanding and proven service record, the famous Bell Model 47 series** has been approved for 1,200 hours of operation between major overhauls. This is twice the previous interval . . more than any helicopter.

This means a substantial reduction in maintenance hours, plus greater availability and use of the helicopter. It means that one man can do the work of two on minor inspection and repair.

Bell helicopters have passed the test of time with more than 2,500,000 hours of actual flight time in 52 countries of the world. Now, with time between major overhauls doubled, Bell proves once again that it is the undisputed leader in the field of utility helicopters.

Bell's low maintenance cost . . its ability to perform so many jobs with time and money saving benefits can add substantially to your profit picture. For more information, write Department 15B, Bell Helicopter Corporation, Fort Worth, Texas.

**Bell Model 47 series helicopters approved for extended operation include the 47G and 47G-2. Military versions of these models are the Army and Air Force H-13G's and H-13H's and the Navy HTL-6's.

BELL Helicopter CORPORATION

FORT WORTH, TEXAS

QUESTIONS
FROM MY MAIL BOX

Q. *Does the TR-102 actually transmit and receive as far as 30 miles?*

A. Yes . . . and under good conditions, with a powerful tower, as high as 60 miles.

Q. *Will it really operate with unshielded ignition systems?*

A. Yes.

Q. *Then how come it's so cheap?*

A. Don't be fooled by the $189.00 price. When dealer distribution goes into effect the re-sale price will be $299.00. So if it's at all possible, your order should be placed now, while direct factory sales at $189.00 are in effect.

AIR-O-EAR 23 CHANNEL

2-WAY VHF

FOR ONLY $189.00 Complete and Ready to Operate

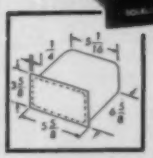
30 to 60 MILE RANGE

NO IGNITION SHIELDING REQUIRED

23 channel Transmitter, sensitive VHF receiver, tunes 108-128 mc. Powerful Superheterodyne circuit with grounded-grid RF amp. Dual tubes used throughout. Precise vernier tuning with temperature compensated drift control. Front Panel Modulation Monitor and Power Level Indicator.

EASY TO INSTALL IN 1 HOUR OR LESS

Here's What You Get . . . 23 Channel VHF Transmitter and Tunable VHF Receiver, Power Supply — Operates from either 6 or 12 Volts, VHF Whip Antenna and Co-ax Cable, Two Crystals, Factory Installed and Adjusted: Tower (122.5), Emergency (121.5)



MEETS FCC and CAA REQUIREMENTS

Weighs 2½ Lbs., Draws 4 Amps at 12 V. Power Supply: 4" x 4½" x 6", Wt. 5 Lbs.

WRITE FOR FREE LITERATURE OR ORDER FROM THIS CONVENIENT COUPON WITH 10-DAY RETURN PRIVILEGE.

NOVA-TECH INC.
1721 Sepulveda Blvd., Manhattan Beach 31, Calif.

Please Ship Air-O-Ear TR-102 with 10-Day Return Privilege. Specify 6 or 12 Volt. Specify Additional Crystals Required at $10.00 Each:

_____ _____ _____ _____

_____ _____ _____ _____

☐ Enclosed is $_____ ☐ Send COD

Name .....

Address .....

City, State .....

MAILBOX

(Continued from page 6)

I'm just a country boy and I don't know any big words, but I think I can describe Mr. Harvey by saying he's the greatest. I think he should be our next President.

And that one, "Crossing the Andes" by Robert E. Wells, the Montevideo banker, is truly a good adventure story. Some mighty fine reading.

I spend every nickel I make on this dry land farm I work going south of the border. I've been all over Mexico but I've always wanted to go to South America and my ambition is to do it like Mr. Wells and his family did—in a light plane.

About that job—I'm getting tired of this farming and if you know of any airplane company or somebody who ain't particular who they hire, tell 'em I'm lookin'. I am single, 27, high school graduate, and a four-year Air Force veteran. I've worked on everything from a T-6 to B-47's—thanks.

You'all keep up the good work.

A cover to cover reader,

BOBO PAVLAS

Hermleigh, Tex.

● *Thanks pahdner. We'll sure keep plugging to see that* FLYING*'s crop of stories meets with ever increasing approval of its readership family.*—ED.

INSUFFICIENT DUAL

That the average pilot has not had sufficient dual instruction is attested to almost daily by lurid but factual news stories. These people are still "spinning in" aircraft that are almost non-spinnable. We still read of accidents caused by errors that only the most unlearned, or uninformed, would make. Visit any airport and see the battered airplanes cluttering up the landscape. Will these people learn by their mistakes and go out and buy a few hours of dual instruction? You know they won't, and don't. It has always been incongruous that a man will spend thousands of dollars to buy and maintain an aircraft, but balk at a few dollars to buy instruction . . . I know of any number of owners who do not know how to operate the radio components of their aircraft, and cannot perform simple beam bracketing.

The AAF was forced by Congress to use civilian contractors for their primary training program. This has given jobs to a few instructors. Yet the salaries the AAF is willing to pay is that of about an elementary teacher's; there is no official recognition of the profession; no retirement program and absolutely no guarantee that the program will live from year to year. This at a time when we are appropriating billions for technological studies, teaching programs and scholarships! The average military pilot is fast to admit that the training he received from a professional instructor in primary has made the difference between his being a poor substitute for an autopilot, and being a highly skilled fighting machine.

The professional flight instructor is getting to be a very scarce phenomenon. Many have gone to greener fields. Some are hanging on grimly in the hope that the profession will gain stature.

The Grim Reaper makes no distinction. He deals with the clowns in airplanes with the same finality as those in automobiles. He is intolerant of complacency, the "I think I'll make it" attitude, lack of knowledge through one's own fault, etc.

This "Old Dad" has been around the aviation scene for some 20 years and has instructed some 8,000 hours. When the day comes that I feel I cannot learn from a "check out" and some concentrated dual given by a professional instructor, I'll hang the old ticket on the wall and take up some relatively harmless sport like skin-diving, dueling, or chasing blondes.

I have no bone to pick but in the interest of flying safety would like to see these sentiments regarding instructors published.

S. A. STAN BRUGMAN

Tucson, Arizona.

PROPELLER CHANGE

Just to straighten out the record on the Lockheed C-130B propellers ("Labors of Hercules" in your January issue): the advanced "B" version of the Allison-powered four-engined Hercules will use the new Hamilton Standard 54H60 advanced Hydromatic propeller, especially tailored to C-130B requirements and successfully tested on the Allison turbine engine. It is quite possible that you did not have this information before press time since the propeller contract award was not announced by the Air Force until mid-November.

This new propeller has been under accelerated development for two years. In addition to the normal speed control common to all Hydromatic propellers the 54H60 incorporates a blade angle control to provide reverse thrust on landing and greater airplane maneuverability during taxiing. Production deliveries will start in June.

E. RUSSEL TROTMAN

Hamilton Standard Div.
Windsor Locks, Conn.

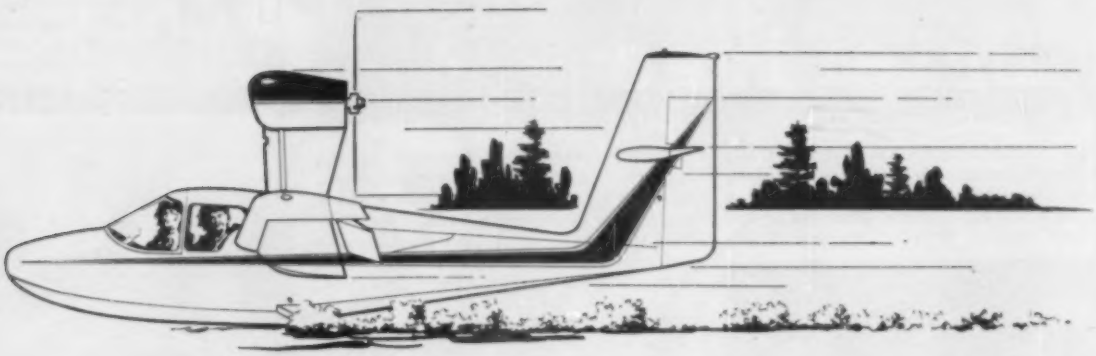
● *Glad to be updated on this matter.* FLYING *had gone to press when this news was released.*—ED.

RUNAWAY PLANE

In reference to "Runaway Plane" in Hangar Flying, January, 1958; this is not the first time anything like this has happened. Some years ago in Perth, Australia, an Auster, whose pilot left the engine running, took off and flew over that city for three quarters of an hour. When it at last flew over the ocean, Sea Furies of the Royal Australian Navy shot it down.

MARVIN SILVER

Winnipeg 4, Manitoba.



You've got to fly it to believe it

It's the 1958 *4-Place* Skimmer Amphibian
With a Completely New Kind of Performance

Fly the Skimmer Tach IV from land or water and your interest in amphibians will take off in a wonderful *new* direction. That's the only way to buy *any* airplane: fly it and let *it* convince you—if it can. We'll bet on the Skimmer any day in the week.

Power and Performance—Set the throttle and you can taxi the Skimmer like a motor boat . . . up wind . . . down wind . . . cross wind. Its true marine hull rides the waves like a boat. And the wind won't tip it on a turn—because the wing floats rest firmly on the *surface* of the water.

Start your take-off run and this agile amphibian, with the dependable 180 Lycoming and the *constant-speed* metal prop by Hartzell, jumps from the water in seconds. It will take off from a small field even faster . . . climb up to 1200 feet a minute . . . cruise at 136 miles per hour.

The Tach IV's extremely slow landing speed enables you to set it down on any landing strip—and *stop* within less than 400 feet. (As you might expect, a good stretch of water gives you room to spare.)

All in all, that makes the Skimmer a "natural" for getting in and out of tight places . . . like small airports and lakes . . . even ponds and bayous.

Exclusive "Hi-Lift" Flaps—One reason for its low landing speed is the Skimmer's *exclusive* "hi-lift" flaps. They work like a charm.

With flaps down, you can cut all power and this graceful, easy-to-handle amphibian tends to *hover* like a bird. But whether climbing, cruising or coming in for a landing, you'll be amazed at the Skimmer's big-plane stability.

Once its wheels touch the runway, or its hull brushes the water, the Tach IV is *in*. All you need to do is to guide it "home" and cut the power.

More Room, More Visibility—Another thing you'll like about the Skimmer is the roomy interior—with the wide seats that give you *extra* shoulder room. You'll like the wider visibility, too, because in the Skimmer you sit forward of the wing. That means you can see up . . . down . . . and almost all the way around.

Construction and Maintenance—One thing you can't see in any airplane are certain construction details. But because this *versatile* amphibian is built for water operations, you can be sure that it's as rugged as they come.

It is also made to take salt spray day in and day out. For every piece of metal in the Skimmer is completely alidined and chromated *before* it reaches the assembly line. This assures you that all "hidden corners" and metal overlaps in the finished plane are protected against corrosion.

As for the engine and propeller, they're mounted above and behind the leading edge of the wing. Thus the Skimmer's wing acts as a shield to protect them from flying spray. Net result: there's no additional engine or propeller maintenance over that of ordinary land planes.

Think of the greater freedom of flight a *true* amphibian offers you. Think of the lakes and bayous and hidden uplands you've never visited.

Why wait? For complete information, or the name of your nearest dealer, write today to national sales headquarters. Address Amphibious Aircraft, Inc., Teterboro Airport, Teterboro, N. J.

SKIMMER *Tach IV*

—the agile amphibian

Dealer Franchises Available. Your Inquiry Invited.

Briefings . . .

IN A DRAMATIC COMPARISON SHOT, the U.S.'s largest and smallest jet combat aircraft, both capable of nuclear attack, cut through the air together. Dwarfed by the USAF Boeing B-52's 156½-feet length

and 185-feet wing span, the Navy's pint-sized—but deadly—Douglas A4D Skyhawk, tears along beside it. A one-man attack bomber, the Skyhawk's wing span is but 27½ feet and its length 39 feet. The B-52 weighs 450,000 pounds—the A4D 15,000 pounds.

FINAL SELECTION of Chantilly, Va., as the site for the national capital's second airport has cleared the way for immediate development plans "for one of the finest jet terminals of the nation." The Chantilly site, some 30 miles due west of Washington National Airport was selected on the recommendation of Gen. Elwood Quesada, special assistant to the President for aviation planning.

RETIRING AFTER 17 years as Link trainer operator for United Air Lines at San Francisco, Lyman (Pop) Ellis jovially greets his successor, Miss Ruth Sprague.

Pop Ellis entered aviation as a pilot in WWI. Miss Sprague joined UAL in 1952 by way of the Navy where in WWII in Korea she served as a Link operator.

EVALUATION of the combined Contact-Instrument flight training courses tested out on ten students of the University of W. Virginia at Morgantown, has clearly shown, according to CAA, that while beginners are being taught to fly they can also be taught (at little or no extra cost) to fly by instruments well enough to save themselves in bad weather emergencies. Financed by the Link Foundation, the course was directed by Leon Z. Seltzer, head of the University's Aero Engineering Dept. Five CAA inspectors gave final examinations and analyzed results. A limited number of the reports are available from CAA.

THE NATION'S DOMESTIC AIRLINES today are being saluted for a safety rate practically unparalleled in modern transportation history—a fatality rate of *less than one* for each 100 million passenger miles flown. Compared with this, the National Safety Council estimated that in 1957 automobile travel cost lives at the rate of *nearly six* per 100 million passenger miles.

ON TOUR OF North and South American, the French two-decker Breguet transport stopped off at New York's Idlewild Airport for two days of demonstrations. Henri Ziegler (left) commercial director of Breguet Aircraft is met at the airport by Frank N. Piasecki, president of

Piasecki Aircraft. With them is Pierre Breguet, son of the founder of the French Company, and v.p. of sales. The two companies have recently entered into a technical exchange and sales-manufacturing agreement.

APPROVAL OF DOYN'S conversion of the Cessna 172 with a 170 hp Lycoming engine has been granted by CAA. The conversion first approved for the 170A landplane is now available for the 170B land and float plane and all 172's. Cruising speed of the Doyn-equipped 172 with Hartzell constant speed propeller is quoted at 141 mph TAS at 6,000 ft., using 75 per cent power. Mr. Galen D. Means has been named president and general manager of Doyn Aircraft, Inc., as the Wichita (Kan.) company is now called.

CONTROL OF FIXED-BASE OPERATIONS at the North Philadelphia (Pa.) Airport has been awarded to Ross Aviation, Inc. of Tulsa, Okla. Heading the operation is Joseph F. Cannon, company v.p. Ross succeeds LaHava Air Service, whose contract had expired. Under terms of the contract Ross will take over leasing of all hangars on the municipally-owned airport, as well as gas and oil services. Upon completion of a new hangar, Ross will have complete aircraft sales and service and an advanced flight training program much the same as it has in Tulsa.

UNDER EVALUATION by the U.S. Forestry service is "Little Vanguard," a solid rocket-propelled forest fire extinguisher developed for the Grand Central Rocket Co. of Redlands, Calif. Developed for the company's own protection on its 8,000-

acre test site, primary function of the tool is to reach inaccessible areas. Payload is 8.5 gallons of borate or 76 pounds of other material. Its range is 410 yards with one rocket or 1,200 yards with two. Cost of production is estimated at $35 each.

BASIC STUDY MATERIALS required in preparation for the new Private Pilot's examination are contained in CAA's new "Private Pilot Examination Guide." Available for 75 cents from the Government Printing Office, the guide explains in detail the nature of this new "scenario-type" written examination, supplies the necessary study materials and a "sample" examination of 82 questions.

REGULATIONS GOVERNING the carrying of landing flares on transport planes in all cases except in extended night over-water operations have been eliminated by CAB. Reasons for the change were cited as infrequency of use and fire hazard of flares.

FLYING FIRE ENGINES of the Air Force now carry their extinguishers externally. Kaman H-43 crash rescue helicopters in production for the AF carry three crewmen and the pilot. At scene of a fire, while the crewmen get to work with

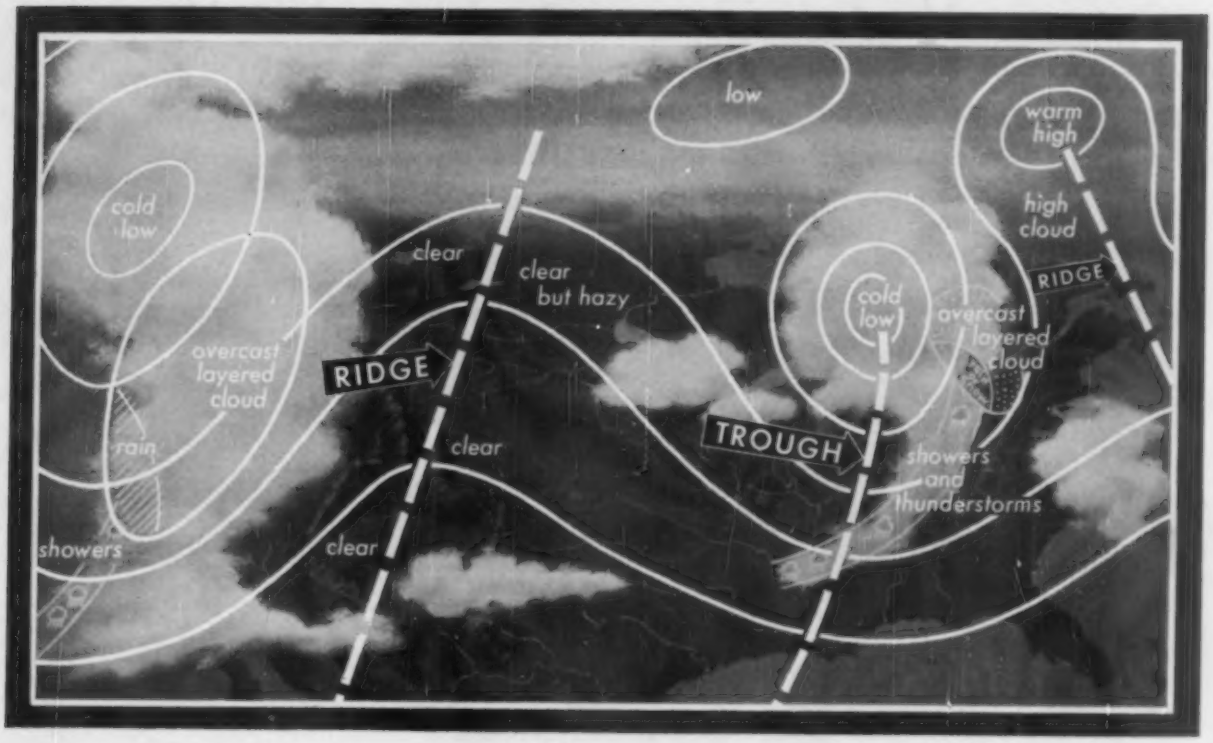
the extinguisher, the pilot aids the crew by using the powerful blasts of air from the rotors to beat down the flames. Helicopter is also used as an ambulance.

PROBABLY THE MOST COMPLETE collection of home-built and midget racing planes ever compiled is being offered by Aero Publishers, 2162 Sunset Blvd., Los Angeles 28, Calif., and book stores through-

(Continued on page 98)

FLY WEATHER-WISE

These weather items prepared in consultation with the United States Weather Bureau



CIRCULATION PATTERNS

Clockwise circulation of air around High Pressure areas and counter clockwise flow around Lows in the northern hemisphere are well known to most pilots. However, there are some lesser-known features of Highs and Lows which have become apparent with the progress made in upper air analysis.

Warm Highs—Extend to levels above 10,000 ft. with temperatures generally warmer than Standard Atmosphere. As this type of High extends farther aloft, it often assumes an elliptical shape with major axis lying N/S to form a *Ridge*. This Ridge normally moves very slowly, blocking eastward movement of weather systems at lower levels, often causing prolonged periods of fair or rainy weather in adjacent areas. Weather in warm Highs is usually dry, fair and often hazy.

Cold Lows—Extend to high levels with temperatures generally colder than Standard Atmosphere. Their normal eastward movement slows until sometimes the center aloft becomes stationary or even retrogrades westward. This is called a Cold Low because of concentration of cold temperatures near the center. V-shaped elongation of these Lows toward the south is referred to as a *Trough* and marks region of wind shift and possible clear air turbulence.

FORECAST: *Top Flight Performance with Mobilgas Aircraft and Mobiljet fuels!*

For piston engines: Mobilgas Aircraft helps assure availability of full power from takeoff to landing.

For jet engines: Mobiljet fuels available for wide extremes in flight temperature conditions. Free flow assured under all conditions. Excellent thermal stability.

Mobil

You're Miles Ahead with Mobil!

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

Leading airlines freely exchange ignition

Divided into six half-day sessions, the Champion-sponsored ignition conferences follow an agenda of questions submitted in advance by participants. Each session is guided by one of six chairmen, all of whom represent airlines. This year's chairmen are pictured above.

ORGANIZATIONS REPRESENTED

Aero Engine Laboratory
Allegheny Airlines
American Airlines, Inc.
American Aviation
Aviation Week
Bristol Aero Engines
Canadian Pratt & Whitney
Capital Airlines
Civil Aeronautics Authority
Co-Operative Industries
Delta Air Lines, Inc.
Eastern Air Lines
E. I. DuPont de Nemours
Ethyl Corporation
Eureka Williams Corporation
Fairchild Engine Division
Flight Magazine
Flying Magazine
Flying Tiger Line, Inc.
Ford Motor Company, A.E.D.
General Laboratory Associates
Hallett Manufacturing Co.
Imperial Oil, Ltd.
KLM Royal Dutch Airlines
La Driere Studios, Inc.
Lake Central Airlines
Lockheed Aircraft Service
Mohawk Airlines
North Central Airlines
Northwest Airlines
Oiljak Manufacturing Company
Ozark Air Lines
Packard Electric Div., GMC
Piedmont Airlines
Port of New York Authority
Pratt & Whitney Aircraft
R.C.A.F.
Real Airlines
Rossford Ordnance Depot
Scintilla Division, Bendix
Seaboard & Western Airlines
Shell Oil Company
Sidney F. Mashbir Company
Sinclair Research
Socony Mobil Oil Company, Inc.
SOHIO
South African Airways
Sperry Gyroscope Co.
Titeflex, Inc.
Trans Canada Airlines
Trans World Airlines
United Air Lines, Inc.
United States Army
United States Navy
Vapor Blast Manufacturing
Wright Aeronautical Division

Walter J. Krissek of Trans World Airlines was chairman of the first session, which dealt with "Spark Plug Service Experience," also served as a chairman in '56.

Delta Air Line's **Dean Miller,** serving as a conference chairman for the first time, headed the session concerning "Recondition, Test and Inspection of Spark Plugs."

George E. Reycraft of North Central Airlines, the only other first-time chairman, presided over the second meeting dealing with "Spark Plug Service Experience."

(Advertisement)

experience for improved engine performance

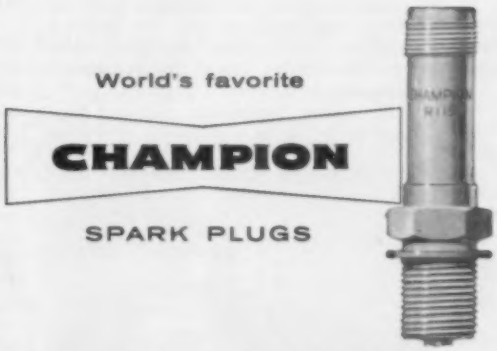
FOR 13TH STRAIGHT YEAR, AIRLINE ENGINEERS HOLD 3-DAY QUESTION SESSION WITH IGNITION EXPERTS AT CHAMPION-SPONSORED CONFERENCE IN TOLEDO

Because scheduled airlines constantly seek ways to make their already excellent engine performance even better, an unusual conference takes place in Toledo each year.

In this conference, business competitors openly discuss all aspects of the operation, maintenance and performance of their aircrafts' ignition systems. Without reservation, they answer all questions – freely passing along know-how and experience that may have cost hundreds of man-hours and thousands of engine-hours to acquire.

Manufacturers of engines and engine parts also take an active part in these discussions, making available all the ignition information in their possession.

The Champion Spark Plug Company, sponsor of these conferences, wishes to thank all concerned for their contributions.



CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

American Airlines' **C. C. Mitchell** headed session on "Research and Development," "Ignition Analyzers," "Magnetos, Harness, Leads," was also a chairman in 1956.

A. A. Weigand from Eastern Air Lines, a chairman in 1956, conducted the discussions on "Spark Plug Fouling" and "Effects of Fuel and Lubricants on Spark Plugs."

Trans Canada Airlines was represented by **Alex Weber,** who presided over the talks on problems of "Jet Ignition," also served as chairman in 1947 and 1948.

(Advertisement)

HANGAR FLYING

GUIDED THROUGH SMOG

THE AUTHOR WAS A one-way, "back seat" guest of Joan Hrubec from Cleveland, Ohio and Marge Miller of Columbus, who were flying Joan's Tri-Pacer to Long Beach, Calif., starting point for the 1954 TAR.

One box of cigars after leaving beautiful and flat Ohio we arrived at Palm Springs, Calif. and could proceed no further that day due to thunderstorms, smog, and haze. The thunderstorms passed during the night. The next morning, with the visibility all of two miles, the local aeronauts could not understand our hesitancy to fly on one of their better days. A phone call to Bob Kreiman, at San Fernando Valley assured us that if we couldn't make it after a good try, he would fly over in a rented Aeronca Champion and guide us to his home base, Whiteman Airport, and then to Long Beach Municipal.

We left Palm Springs with full tanks, and four different and conflicting ways to negotiate the pass. What appeared to be the worst part of the trip turned out to be the easiest, until we passed March Field. Here the ceiling came down faster than we did and a quick landing was made at Corona.

I phoned Bob from the radio station, and one hour later he and his co-pilot wife, Shirley, came put-putting out of the smog. There ensued a short conference on how a Tri-Pacer should fly formation behind a Champ; Bob said something about wiggling his wings if he wanted to turn and we were off.

Soon after being airborne and before Joan could slow down the Pacer, the wings of the Champ rocked back and forth. At this moment we were slightly below and to the left of Bob's plane. Not being able to see which way he was going to turn, Joan did a tight 360 to the left, and low and behold, our guide was swallowed up in that beautiful California sunshine. We then were somewhere northwest of Corona with high hills all around us. Suddenly, out of nowhere appeared a small airport.

Again we descended, but had to circle the field twice before we could break into the traffic pattern. Seems as though Sunday California pilots fly VFR on days when their Ohio counterparts are home.

Also in the pattern, but turning on the opposite side of the field and therefore out of sight, was the Champ. Bob guessed right as to what happened and where we would be.

Before the second take-off we revamped our strategy. I flew with Bob, while his wife took my place in the rear seat of the Tri-Pacer. This way, both planes were equipped with human ADF's.

After flying down highways, turning left at gas stations and right at flashing neon lights, Bob announced we were on final for Whiteman. All I could see were two small mountains, right in the middle of this so-called field?

Joan missed a stop light en route and landed safely several minutes later.

RICHARD C. MCCONNELL
Cleveland, Ohio

PIPE BY AIR

A DRAMATIC EPISODE IN air history was written recently when a Southern California irrigation company and an airline combined forces to save a drought-stricken coffee plantation more than 2,000 miles from the company's headquarters in Vista, Calif.

The rescue operation entailed the shipping by air of a complete irrigation system composed of over a mile of four-inch aluminum pipe.

Irrigation pipe being loaded aboard a C-82.

It all came about when Guatemala suffered one of its worst droughts.

A Guatemalan student of irrigation engineering, Carlos Andres, spent several weeks last summer in Vista studying irrigation processes with Will Kinney, head of Port-Alum Irrigation Co., and a nationally recognized authority on the subject.

When the drought came, Andres wired Kinney for help, outlining the situation and asking the expert's advice. Kinney studied the problem and came up with a solution. It called for the installation of a portable irrigation system on Andres' coffee plantation but the job had to be done immediately if the Guatemalan's coffee bushes were to be saved.

Kinney contacted Pan American World Airways and asked if they could ship pipe by air. Officials of the airline thought it could be done although it had never been tried before in Southern California. Campania Mexicana de Aviacion, a Pan American affiliate, agreed. The latter had just put into operation a Fairchild C-82 "Packet" cargo plane which officials thought could be used.

Kinney's pipe was cut into 40-foot lengths and trucked to Tijuana, where it was loaded aboard the Mexican airline's cargo planes. It took four plane loads to transport the pipe but it all reached Guatemala in two days. Andres was ready to go into action as soon as the pipe arrived and it was quickly installed on the plantation.

Water from the wells and a reservoir was turned on and directed into the hastily-laid pipe saving the coffee plantation along with Andres' pocketbook.

OWEN CALLIN
Vista, Calif.

RADAR TO THE RESCUE

IT ALL STARTED OUT as a routine cross-country flight from Craig Air Force Base, Ala. 1st Lt. K. R. Cowser, USAF, stopped at Walker Air Force Base, Roswell, N. M., to refuel and headed his T-33 jet trainer to Long Beach, Calif.

But somewhere along the way he lost his bearings. After vainly trying to locate his position, he glanced at the fuel gauge to discover there only remained enough fuel for about 12 more minutes' flying time.

Hastily he tuned in the guard channel on his radio (emergency channel for aircraft in distress). Estimating that he was somewhere near Long Beach, he tried to contact Long Beach Municipal Airport.

"Long Beach, this is Air Force Jet 786 . . . Over," he said into the mike.

After an anxious 30 seconds of dead silence, Cowser tried again. "Long Beach, this is Air Force Jet 786. Request a steer to field." Hesitatingly he added, "I've only got 90 gallons of gas left . . . Over."

Meanwhile 1st Lt. James D. Pauly of Marine Air Control Squadron 9, El Toro Marine Air Base, was just settling down in the Combat Air Operations Center to monitor his radar scope.

Suddenly he was jerked into action by Lieutenant Cowser's message blaring over the emergency channel to which an Air Control Squadron always keeps one radio tuned.

"Air Force Jet 786, this is Blackbird, El Toro Ground Control Intercept. Can we help you . . . Over?"

Back over the ether came Lieutenant Cowser's answer, coupled with a deep sigh of relief, "That's affirmative. I've only 80 gallons of gas left. Can you get

(Continued on page 16)

THE SUPER CUSTOM *Tri-Pacer* GIVES YOU

THIS PERFECT FLIGHT-PLANNED PANEL

Here's the perfect combination of instruments and equipment offered to you in a factory-installed package in the Super Custom Tri-Pacer. It gives you a full gyro panel with an engine-driven vacuum pump, 12-channel VHF transmitter (9 crystals provided) and three-way radio navigation – Omni, LF range and homing loop.

For instrument training, for actual instrument work, the Tri-Pacer's panel is acclaimed as the best layout available today. All flight instruments are placed directly in front of the pilot, radios conveniently located in the center.

Study the Tri-Pacer's perfectly flight-planned panel, compare it with others, you'll find it gives you the nicest, most functional, most complete "flight office" among low-priced, four-place business planes –and at far lower cost... only $10,275 for this complete, ready-to-go, cross-country airplane, complete from lights to lighter! Standard Tri-Pacer priced at only $8,395.

PIPER

AIRCRAFT CORPORATION
Lock Haven, Pennsylvania

FASTEST IN ITS CLASS!

Optional 150 or 160 hp Lycoming engines give the beautiful new 1958 Tri-Pacer over 130 mph cruising speed at 7,000'. In every category the Tri-Pacer gives you better performance and a "much smoother" ride—all at far less cost! For a real thrill fly the new Tri-Pacer 160. See your dealer or write Dept. 4-G, for new 1958 Tri-Pacer brochure.

Ask your Piper dealer about capital-conserving finance and lease plan.

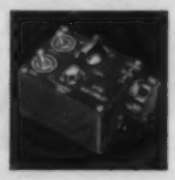
MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

makes long "On Top", rough air, X-country and IFR flights safer, easier!

Having hands free to copy clearances, use charts, study approach plates, work radios, etc., is possible with almost any autopilot but—the important thing is knowing *which* autopilot to buy! The Federal Tubeless Autopilot offers the only new concept in up-to-date autopilot design. In addition to being a true 3-axis autopilot, Federal is of simple trouble-free electro-mechanical design assuring highest reliability and lowest maintenance cost compared to all other types. For *extra utility* from your aircraft (and resulting lower cost of operation), buy Federal—the tubeless autopilot with the easiest "set up and go"—"ready to get up and go" features for maximum in-flight benefits and minimum down-time delays! Remember—*the most valuable extra hands in the cockpit are your own*—set them free from the controls with Federal and arrive fatigue-free wherever you fly!

Federal **Tubeless Autopilot**

For your free illustrated copy of "Freehand Flight" brochure, write: Industrial Products Division, International Telephone and Telegraph Corporation, 15191 Bledsoe Street, San Fernando, California.



The Federal Autopilot is CAA certificated for the Aero Commander, Beech Bonanza and Twin Bonanza, Cessna 172, 180, 182, 310 and Piper Apache.

Industrial Products Division IT&T INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

Hangar Flying

(Continued from page 14)

me in to El Toro?"

Lieutenant Pauly asked the pilot, "Do you know your approximate position?"

A negative reply brought a perplexing frown to the air controller's brow. Somewhere in the air above him was a human being suspended in a metal bird; and the safety of both depended upon the decisions he would make within the next ten minutes.

Luckily the aircraft had a "Parrot" device which enables a radar controller on the ground to identify an airplane's position in the air miles away. And luckily again, the plane was located only five miles east of El Toro.

And while Lieutenant Pauly was turning the fuel-thirsty aircraft towards the field, Lt. R. R. Hungerford, who was operations duty officer in the tower that night, was just biting into a ham sandwich. A jarring telephone swept Lieutenant Hungerford into the start of a chain reaction. Immediately the runway lights were turned up for the pilot's benefit, and the ground control approach radar operator began sweeping the sky to locate the stricken plane.

During this time Lieutenant Pauly had given the pilot directions steering him three miles from the airstrip. But still the pilot could not see the field. At two miles away he yelled into his microphone the international distress signal, "Mayday, mayday," and began unstrapping his harness to eject from his craft.

Suddenly the jolt from an unexpected air current caused the plane to tip to the right, and as his wing dipped, the pilot's glance caught the welcome row of white runway lights. One minute later Lieutenant Cowser felt the relieving squeal of rubber on concrete as he landed safely with only seconds of fuel remaining.

Thus radar and its quick thinking operators once more pooled their efforts to save $220,000 worth of airplane for the government and the taxpayers; and what is even more important, the 98 cents worth of chemicals in a human body lived to fly another mission.

LT. ROBERT M. CULLERS, USMC
Santa Ana, Calif.

WRONG WELCOME

I HAD JUST completed patrolling a million miles of electric transmission line and was sitting in my little Piper "Triple Nine" dreaming about the stories that Piper's house organ "Piper Pilot" had been running about my patrol service when instructions from the Nebraska city municipal airport tower directed me to land on runway one-seven.

While being guided toward the Terminal Building, I saw the huge, colorful banner stretched across the front of the Terminal building with yard-high letters proclaiming: "Welcome To ....."! A large crowd pushed against the fence and a brilliantly uniformed band was

(Continued on page 94)

Get there FAST in a '58 Beechcraft Bonanza

. . . FIRST with fuel injection

'58 BONANZA'S NEW ENGINE WITH FUEL INJECTION

GO FARTHER—FASTER

The four-place *Beechcraft* Bonanza
RANGE – up to 1,060 miles nonstop
SPEED – up to 210 miles per hour

Tomorrow's power — fuel injection — is yours today in the New Beechcraft Bonanza for '58! For the first time in commercial aviation, the magic of fuel injection gives smoother performance and 200 miles per hour cruising speed with the Bonanza's new 250 horsepower engine.

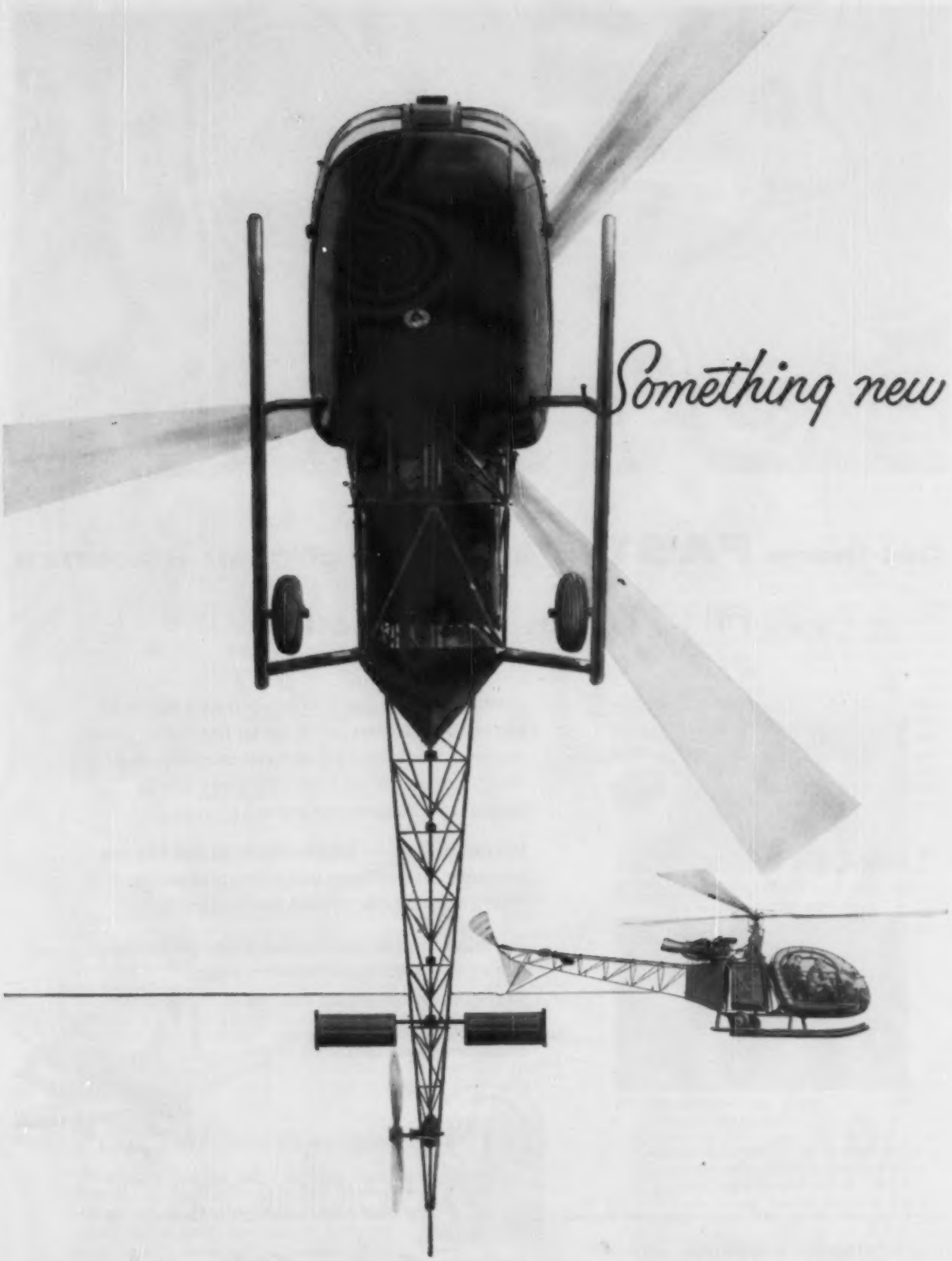
Now you can go faster, get there earlier, get more done than ever before. And you'll enjoy the supreme quiet and comfort of the Bonanza cabin as you watch the miles hurry by.

The '58 Beechcraft Bonanza is at least 30 miles per hour faster than any other single-engine commercial airplane. This rugged and right airplane uses less fuel than your family car, and no airplane is easier to fly!

Beechcraft

For information about the **Bonanza** and the finest leasing and financing plans in aviation, see your Beechcraft distributor or dealer, or write Beech Aircraft Corporation, Wichita 1, Kansas, U. S. A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS


Something new

. . . . *in the air!*

ALOUETTE

world's first production turbine helicopter

The Alouette, miles and years ahead of any other helicopter in the air, is completely revolutionary. It embodies many remarkable features which represent the newest advances in modern European engineering.

Designed in France by Sud Aviation, the Alouette is presently assembled and marketed by Republic Aviation's newly formed Helicopter Division which parallels the Alouette in originality of concept ➤ ➤ ➤ Republic's Helicopter Division is the first organization of its kind to devote its facilities primarily to commercial helicopter needs. Complete manufacture of the Alouette in the United States is Republic's ultimate, short-range goal. ➤ ➤ ➤ The Alouette has already built up an impressive flight log of more than 26,800 miles throughout its U. S. tour. During its demonstrations in 31 cities to commercial air transport companies, feeder line operators and private enterprise, it proved its superiority conclusively . . . both economy-wise and flight-wise.

Because of its extraordinary versatility, it can do many jobs heretofore considered outside a helicopter's capabilities. Thus the Alouette is ideally suited to the needs of a broad range of industries.

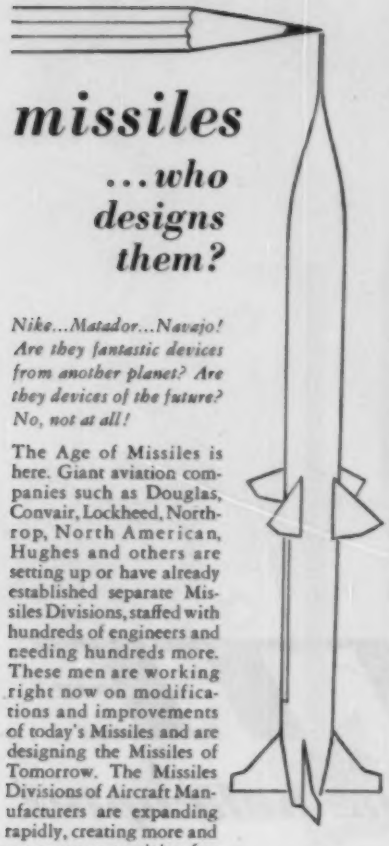
- No warm-up time
- Instant take-off
- Simplified controls
- Radically lower maintenance costs
- Instantaneous power response at no sacrifice to rotor RPM
- Faster cruising speed
- No engine vibration
- Fuel economy
- High altitude performance
- All-weather operation

Write for descriptive pamphlet

REPUBLIC AVIATION

HELICOPTER DIVISION

FARMINGDALE, LONG ISLAND, N. Y.



missiles

...who designs them?

Nike...Matador...Navajo! Are they fantastic devices from another planet? Are they devices of the future? No, not at all!

The Age of Missiles is here. Giant aviation companies such as Douglas, Convair, Lockheed, Northrop, North American, Hughes and others are setting up or have already established separate Missiles Divisions, staffed with hundreds of engineers and needing hundreds more. These men are working right now on modifications and improvements of today's Missiles and are designing the Missiles of Tomorrow. The Missiles Divisions of Aircraft Manufacturers are expanding rapidly, creating more and more opportunities for trained men.

NORTHROP AERONAUTICAL INSTITUTE trains men for a career in Aeronautical Engineering—a career in Aviation's newest development—"Missiles." There is a waiting list for Northrop Graduates. And Northrop prepares you in just two short years. Think what this saving in time means in dollars saved and extra dollars earned! Long before many others are out of school you can be well on your way in whatever phase of Aeronautical Engineering you may choose to follow.

APPROVED FOR VETERAN TRAINING

Take your first step toward

SUCCESS IN AVIATION

WRITE FOR FREE CATALOG

Northrop

Aeronautical Institute

An Accredited Technical Institute

1119 W. Arbor Vitae Street

Inglewood 1, California

NORTHROP AERONAUTICAL INSTITUTE

1119 W. Arbor Vitae Street, Inglewood 1, California

Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:

- ☐ Aeronautical Engineering Technology
- ☐ Aircraft Maintenance Engineering Technology
- ☐ Master Aircraft and Engine Mechanic
- ☐ Jet Engine Overhaul and Maintenance

Name ..... Age.....

Address .....

City ..... Zone.... State.....

Veterans: Check here ☐ for Special Veteran Training Information.

HAVE YOU READ?

By JAMES F. SUNDERMAN

FIVE DOWN AND GLORY: A HISTORY OF THE AMERICAN AIR ACE, by Gene Gurney and Mark P. Friedlander, Jr. (G. P. Putnam's Sons, $5.75).

For the first time, the complete story of American aces is collected in one book. The authors combine narrative and statistics to weave a history of U. S. airmen with five or more individual victories from WWI through Korea.

The book is an encyclopedia of ace information. Chapters deal with the U.S. Air Service in WWI, the Flying Tigers, and the Eagle Squadron. World War II proper is covered by chapters on Navy and Marine air operations and the major USAAF War Theaters—Far East, CBI, North Africa and Mediterranean, and Europe, which in turn break down into numbered Air Forces and lower fighter units.

Each chapter recounts the history of fighter operations against the background of the overall military operations; and concludes with an authentic tabulation of aces by scores (air, ground—if applicable—and total). The appendices contain exclusive items such as a chart listing top aces of all services and all wars (with scores, biographical sketches and unit assignments), Congressional Medal of Honor Aces (with citations and pictures), summaries of WWI, WWII and Korean air operations, and selected overall aerial statistics.

The book is prefaced by the definition of an ace, the origin of the term, and the ground rules.

Five Down and Glory represents six years of data research. It is an outstanding contribution to the history and literature of the air.

THE FORD STORY: A PICTORIAL HISTORY OF THE FORD TRI-MOTOR, 1927-1957, by William T. Larkins (Robert R. Longo, paper-cover edition $4.95; hard-cover edition $7.95).

THE GEE BEE STORY, by Charles G. Mandrake (Robert R. Longo, paper-cover edition $2; hard-cover edition $4.95).

Both these books are excellent historical contributions—authentic and well compiled.

U. S. AIR FORCE ACADEMY: THE LIFE OF A CADET, by Jack Engeman (Lothrop, Lee and Shepard, $3.50).

The new Air Force Academy in its temporary quarters at Lowry Air Force Base, Colo., is presented in photo and brief narrative. Hundreds of pictures depict cadets at work and play and introduce a new element to military academy curricula—flying.

The book follows cadets on a summer air cruise to Europe; visits various AF bases in the ZI where cadets receive practical instruction in aerial weapons, maintenance and many other phases of air operations. A perspective for young men seeking through the academy a career in professional airmanship.

AIR DATES, by L. G. S. Payne (Frederick A. Praeger, $7.50).

This American edition of a British original compiles major and minor events in military and civil aviation, as well as political and economic happenings with bearing on aviation. Entries are listed chronologically from the First French balloon ascent in 1783 to 31 December 1956. The early years of flight are thinly treated and over-emphasis is placed on WW II. One good feature is a comprehensive index.

THE FIRST FIVE MILLION MILES, by Byron Moore (Harper, $3.75).

Published in 1955, this unique account by a veteran American Airlines captain, is more a monograph on the development of commercial airlines than an autobiography which it purports to be.

Captain Moore's air career roughly parallels in time that of Ruth Nichols'. Whereas Ruth chalked an enviable score of "firsts" and "headlines" (in the main because she was a woman in a field that was almost exclusively a man's province) it was actually the Byron Moores who were the yeomen of American aviation.

Moore trained in the U.S. Army Air Service in the early 1920's, and after release, knocked from pillar-to-post barnstorming, test hopping, airmail flying, stunting and whatever else might bring in a spare buck. In 1930 he joined Thompson Aeronautical Corporation and flew Loening amphibs across Lake Erie. When American Airlines absorbed Thompson, Moore went into the AAL system and at the time his book came out was a senior DC-7 trans-continental AAL pilot.

His story traces commercial aviation from its infancy in terms of major facets of the game like navigation; weather; maintenance; passenger service; radio, radar and telephone communication; aircraft types, models, speeds, comfort, and efficiency; flying training and proficiency; aviation personalities; and other aspects of the day-to-day world of commercial air. Wherever feasible he brings in his own experiences over the years to show how development and progress sprung from crude beginnings.

"You know as well as I do, Bob... the safest engine is a clean engine... and there's no cleaner engine than a Gulf-lubricated engine!"

Use new Gulfpride Aviation Oil Series D, the detergent oil, or Gulf Aircraft Engine Oil, the straight mineral oil. Either way, you'll be keeping your engine clean, and playing it safe.

Gulf oils lubricate engines thoroughly and efficiently and also keep engines clean.

That means increased periods between engine overhauls, because of less wear and tear on engine parts.

Gulf Aircraft Engine Oil is the finest straight mineral oil you can choose—keeps engines as clean as any straight mineral oil can. But for the greatest possible cleanliness, buy Gulfpride Aviation Oil Series D, the detergent oil.

Gulfpride Aviation Oil—Series D. Detergent Oil—for greatest possible cleanliness in radial, inline and horizontally opposed engines.

Gulf Aircraft Engine Oil—Straight Mineral Oil that minimizes sludge and oil inlet screen deposits, keeping your engine clean and safe.

GULF AVIATION PRODUCTS ...the world's finest aviation products

THE NEW LOCKHEED

AMERICA'S FIRST PROP-JET AIR FREIGHTER DESIGNED TO TRANSPORT THE GOODS OF THE WORLD IN THE JET AGE

The new Hercules air freighter is a more powerful, longer-range commercial version of Lockheed's military C-130—the performance-proved "go-any-place, haul-anything" combat cargo carrier of the U.S. Air Force.

The first Jet Age aircraft specifically designed for air freight, the new HERCULES has a huge rear loading door—enabling it to swallow whole truckloads of assorted cargo. No other commercial cargo

LOCKHEED *means leadership*

HERCULES

plane now available can match the HERCULES in fast loading and unloading—of all types of cargo, no matter how big or heavy.

The new HERCULES is completely pressurized and air conditioned. The long-range crew compartment, developed from operational experience, provides for a maximum of crew efficiency, safety and comfort: flight deck galley, crew bunks, toilet facilities, lock-and-key stowage space, and advanced type soundproofing and insulation.

Powered by four 4050 h.p. Allison (General Motors) 501-D prop-jet engines, the mighty HERCULES can take off from or land on short runways and improvised fields, fully loaded.

Wherever air freight is needed, any place in the world, the HERCULES can get it there in a hurry, at a profit to airline operators.

GEORGIA DIVISION, *Lockheed Aircraft Corp., Marietta, Ga.*

Lockheed's mechanized freight handling system injects this huge load of cargo into the HERCULES in just 40 seconds. System unloads freight with same speed.

High-speed system demonstrates 90 per cent reduction in aircraft loading time, cutting costs and increasing profits through greater plane utilization.

Even veteran pilots are amazed at the short take-off run and the steep rate-of-climb performance of the new HERCULES carrying capacity loads of air cargo.

The Foundation

GILL ROBB WILSON
Editor and Publisher

IN THE FORMATIVE DAYS of civil aviation, before the Bureau of Air Commerce had evolved into the Civil Aeronautics Administration, I was accustomed to being hailed in the Commerce Building, half in fun and half in annoyance, as "the old vigilante."

Actually, I wasn't old and I wasn't a vigilante but I did believe and still do that the nature of a foundation determines the kind of a building that can be erected upon it. No nation can build relatively great airpower unless participation of the greatest possible number of its citizenry is permitted, by one device or another.

In the United States, where our way of life is that of free private enterprise, general aviation is the medium of broad citizen participation. Any unnecessary restriction on general aviation is a national disservice.

Now it is easy to forget this fundamental in the heat and competition of modern commerce and defense, even though any one who has lived the authentic story of American aviation will agree that both commerce and defense had their origins and drew their growing sustenance from general aviation.

Nor is this the case in the United States alone. It is so in the Soviet Union. Even a totalitarian government dared not attempt to build great national airpower by fiat.

We have heard much recently of "the swift growth of Soviet airpower." That is pure rubbish. Soviet airpower hasn't grown swiftly—just inevitably. And its growth has been able to reach a lofty stature because it has had the breadth of base to sustain such stature. True, such a base was not achieved by our good method of free private enterprise. The Soviet citizen did not have the pocketbook or the liberty for such. But the government assured the breadth of base just the same.

The original instrument was Osoaviakhim, a "peoples organization," founded around 1927. It got literally millions of Soviet citizens thinking about and participating in aviation—from model building youngsters to sedate educators. Practically every Soviet community of any size had an airstrip or meadow devoted to whatever kind of aviation it could support. In fact, the big Soviet Aviation Day on which the Kremlin now thumps its chest at the Moscow airport originated as part of this broad base.

By 1937, Russia was seeking the world's long distance flight record across the pole from Moscow to the United States! The Russian Ambassador traveled from Washington to San Francisco to greet the projected flight. I happened to be in Boise, Idaho, at the time and, noting that the west coast was due to be socked in, turned north to Portland, Oregon. Nearby lay the airstrip of Vancouver Barracks and at least one of the Soviet crew was familiar with that layout. It seemed a good gamble that the long flight might terminate there. And so it proved.

I've never forgotten what I learned there. In conversation with Valerie Chkalov, Georgi Baidukov and Alex Belyakov, one of them remarked, "Our luck wasn't in making the flight. It was in being chosen to make it. There are more than 60,000 pilots in Russia who could have done as well as we."

That seemed incredible at the time but, as they told about the work of Osoaviakhim, the breadth of citizen participation in Soviet airpower came logically into focus. True, the ANT aircraft they flew wasn't much but a high lift gas tank—nothing about it to indicate technological superiority—but Russia was on the right track to great airpower just the same. They understood the inherent nature of the thing.

Since those days, of course, Osoaviakhim was streamlined to fit the advancing conditions and had taken another name but the theory behind it is continuous and deliberate —broaden the base.

This then is something for the gentlemen in Washington who must keep our ducks in a row, and for every thoughtful airman in any walk of the field to conjure with. It is something to remember in the rivalry for air space. General aviation is the American way of broadening the base. We must be extremely cautious lest, by downrating its comparative place as a partner of commerce and defense, we kill it by limitations and restrictions—something even the totalitarians dared not do by either neglect or edict.

Certainly, general aviation must make concessions to the welfare and safety of the whole of American air capability. But these concessions must be the reasoned ones of partnership rather than the arbitrary ones of pressure. That our sins of omission and commission have resulted in intolerable air traffic conditions does not justify that we set lesser air skills to crawling the contours of our terrain under 700 feet or impose perfect meteorological conditions as a prerequisite of entrance to a control zone.

Assuredly, air traffic is in a critical condition and time is lacking to work out the basic long range solutions to be ultimately found in such elements as an overhaul of pilot training, aircraft design requirements for traffic mobility, and procedure automation. Space separation, both vertically and horizontally, seems the only immediate avenue of relief. But let's not make them so onerous for general aviation's developing skills that we kill the incentive to the broad base which must underlie any truly great national structure of American airpower. More light and less heat. The stake is not alone air safety. It is national survival. Let our solution to the former be found within the scope of the latter. In the ultimate we stand or fall, survive or perish together. If we have not the consciousness of "togetherness," we have lost our vision.

HOW AMERICAN'S FAMILY HALF-FARE PLAN MAKES GROUP TRAVEL EASY

Family Half-Fare rates are in effect on American Airlines from 12:01 noon Mondays to 12:01 noon Thursday.

During this period any person purchasing a full fare ticket can take along his or her spouse and their children for half fare.

American originated the Family Half-Fare Plan to make group travel easier for everyone. For instance, on a coast-to-coast trip for a family of four, the savings on Family Half-Fares may amount to hundreds of dollars.

American's easy credit terms also enable travelers to start a trip with only a small down payment and pay off the balance in convenient monthly installments.

AMERICAN AIRLINES

America's Leading Airline

11 DAYS OVER THE

A record-breaking flight sparked renewed interest in the military and commercial value of airships.

By JACK HUNT, CDR, USNR

IN MARCH, 1957, the *Snowbird*, a standard Navy blimp out of South Weymouth Naval Air Station, Mass., made a sustained flight of longer duration than any ever accomplished by any type of aircraft without refueling—11 full days, 264: 20 hours. The mission also accomplished the longest non-stop flight by an airship, 8,216 nautical miles, all over water, eclipsing the performance of the former Graf Zeppelin between Friedrichshafen, Germany, and Tokyo, Japan. The *Snowbird* further achieved the first tri-continental non-stop, non-refueled journey by an aircraft—North America to Europe, to Africa and return.

We did not, however, originate this project to eclipse old records or to establish new ones. Specifications of the *Snowbird* included the ability to transit the Atlantic and the Pacific. Was the blimp capable of performing up to her design specifications? Airship men thought so but no one had ever proved it. It is intolerable to have an unproved tool at hand for either defense or commerce. We had made many evaluation tests of the *Snowbird's* design capabilities but never one of her full transit ability.

There was a major consideration not to be overlooked. In case landing on some foreign shore became necessary, we must assure that no international complication ensued. Barging in unheralded on some foreign airport, no matter how friendly, could be embarrassing to all concerned. We therefore worked out a program to cover that contingency and, armed with data pertaining to this and other areas of consideration, we went to Washington to seek approval of the Navy Department. At first we encountered opposition but this was overcome when the Admirals became convinced that our program was essential and comprehensive of good international relations. We not only won approval but encouragement.

Next we took an airplane and visited airports on the periphery of the North Atlantic—Keflavik, Iceland; Shannon, Ireland; St. Magawn, England; Bordeaux, France; Lisbon, Portugal; Port Lyautey, Africa; Lages, Azores; and Bermuda, B.W.I.

We told airport officials of the remote possibility that we might land the *Snowbird* at their field. If so, we would bring an airplane with a ground crew and a transportable mooring mast. Our need would be a few men to help with ground handling during landing. All were most cooperative. With their help, we picked sites for possible erection of masts and explained how landing and mooring were accomplished. I believe each group secretly hoped we would have to land at their airport so they might see the operation first hand.

NORTH ATLANTIC

The *Snowbird*.

Many other plans and preparations were necessary. The crew was chosen and required to get details set for the unusual nature of the flight. Aerologists had to calculate favorable take-off time and arrange to give us an up-to-date weather picture throughout. Mechanics had to tune the engines to perfection and assemble special supply kits of spare parts. Electronicsmen had to "peak" their equipment and pack spare tubes. A study of dietetic needs in view of space and weight limitations was necessary. Engineering Officers made up graphs and tables of power settings for most economical fuel consumption. Navigators prepared to use the various aids encountered in areas we would traverse. In fact, the entire complement of the Naval Air Development Unit helped ensure the success of this flight.

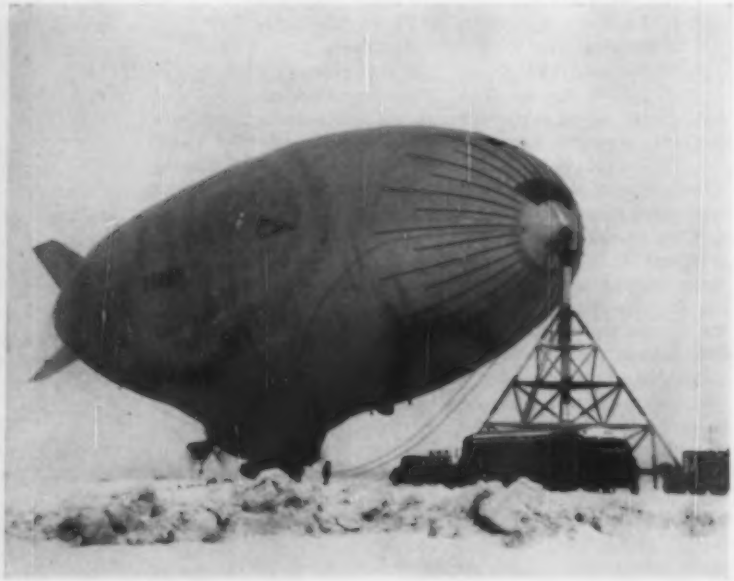
Our airship, the *Snowbird*, was a standard configuration used in Anti-Submarine Warfare, designated as a ZPG-2. From afar she appears small and frail, but is higher than a ten-story building, longer than a football field and contains a million cubic feet of helium. The car is as long as two transcontinental buses and has two decks. The lower houses the pilot's compartment, the electronics equipment, the engines, the fuel tanks, and toilet facilities. On the upper deck are crew bunks, a wardroom with two tables seating four people each, and an adjacent galley. Power to propel the airship and supply electricity for operation of the intricate electronic systems is furnished by two 800-hp engines located within the car. Either engine can be stopped for repairs or servicing during flight. Long drive shafts transmit power from the engines to the propellers located in outrigger nacelles. The propeller can be disengaged and feathered. The streamlined compartment behind the propellers houses the landing gear when retracted. Huge fins on the tail of the airship are arranged in a novel X shape. Flippers which give the blimp directional and up and down control are called ruddevators.

By the end of February '57, preliminary arrangements had been completed and the flight crew picked from a long list of volunteers. Each was selected for what he could contribute in special skills and temperament.

The final crew list was:

Commander Jack R. Hunt	Airship Commander
Commander Ronald W. Hoel	Copilot
LCDR Robert S. Bowser	Copilot
LT Stanley W. Dunton	Navigator
LT Charles J. Eadie	Navigator
LT John R. Fitzpatrick	Flight Engineer
Mr. Edgar L. Moore	Flight Engineer

Left: CDR. Jack R. Hunt, commander of the *Snowbird*, briefs crew before flight. Right: Preparing for take-off at NAS, South Weymouth, Mass.



The *Snowbird* at the time of her arrival over NAS Boca Chica Field, Key West, Fla.

L. N. Steffen, ALC	Radioman and Crew Chief
W. S. Dehn, Jr., AG1	Aerologist, Photographer
G. A. Locklear, AM2	Rigger and Cook
T. L. Cox, AD1	Flight Mechanic
J. R. Burkett, Jr., AD2	Flight Mechanic
F. J. Maxymillian, AT2	Radioman
C.W. Meyer, AE1	Electrician

Each drew special flight clothing—two summer and one winter flying suit, winter flying boots and a parachute bag for personal items. Every man was allotted space for 25 lbs. of baggage aboard the Super Constellation which was to play leap frog with us, carrying our ground crew and mooring mast.

Monday, March 4, was a cold, windy day. Excitement gripped South Weymouth. By late afternoon, we had completed a short test flight and all hands were busy loading the *Snowbird*. As I made last minute calculations on weight and balance, the Maintenance Officer reported the temperature falling. It would be possible to add more helium to the big bag. This was welcome news. The more helium we could add, the more lift would be gained. The entire crew knew this and I was soon besieged for permission to take more supplies.

Finally, everything was set and the *Snowbird* was towed out the hangar door. As I walked alongside the blimp, I remembered when I had first reported in at NADU. We were scheduled to get a new airship especially equipped for icing conditions. I was to be in charge of the all-weather evaluation program. One of the first officers I met was Lieutenant Fitzpatrick. John was not an airshipman but a Maintenance Engineer, one of the best. At the time, he made a hobby of figuring the potential endurance of a blimp. He spent hours developing charts and graphs to prove an airship could stay aloft without refueling for ten days, and wanted to try it. I was wary of an endurance flight. My dream was to fly nonstop to Europe or Africa and prove an airship completely operational. Then we would know the ship was capable of doing what it was designed to do. So, John started another set of figures based on long distance flight. He had to give up some of his potential to stay aloft, but still felt it could make an impressive record. We eventually interested others and began to conduct "paper" flights. Each day one of us would take off from South Weymouth and head for the Azores, using the tables that Lieutenant Fitzpatrick had made. Our wind and weather would be determined from the weather map issued daily from Washington. We found we could get to the Azores in as little as 42 hours, and never exceeded 120 hours, with an average flight time of 72. We always had lots of fuel remaining when we got there.

Well, here we were starting on an actual flight—the real McCoy. The take-off condition was just like we had worked out on paper. What would the landing conditions be like? When? Where? I went forward to the compartment and took my place in the pilot's seat. Bowser passed the word over the inter-com for all hands to man take-off stations and gave a big thumbs up.

I signaled for the take-off and the ground handling officer disconnected the huge mobile mooring mast. There was a sharp crosswind from the left. I was headed diagonally across the runway where a high snowbank would be hit by the propeller if we drifted into it. As I eased the throttles forward, the ship began to roll; I gave it full right rudder, but nothing happened. The nose would not come around and we were headed for the snowbank. I reversed propellers on both engines. The ship shuddered, almost stood on its nose, and finally backed down to the center of the runway. At long last, the nose came around. I pushed the throttles forward again and this time we were able to follow the white line marking the center of the runway until it faded out of sight beneath us. As I eased the throttles back to cruising and Bowser retracted the wheels, the flight rigger leaned over my shoulder and said, "Sir, that was almost the shortest endurance flight on record!"

FIRST DAY

We left the ground at 6:30 p.m., E.S.T., but planned to use Greenwich Meridian Time, so set all clocks up to 11:30 p.m. As we reached 1,000 feet, the navigator gave me the course, 080 degrees. At midnight we set the first watch and I made my first log entry, "0001, 5 March. I have the watch, Commander Hoel is in the pilot's seat,

Lieutenant Fitzpatrick in the copilot's seat, and I am in the command pilot's seat. Weather is snowy and cold, air slightly rough, but everything fine. It's awful quiet up here in the cockpit; I imagine we are all thinking of the long flight—and how small a beginning we have made."

The rest of the day was much like any other airship patrol. We operated both engines at normal cruise and all stations were manned. It was bitter cold. Late in the afternoon, a Coast Guard patrol plane circled us and inquired by radio what we were doing in "their" ocean. They were locating and charting icebergs and, picking us up on radar, were confused because we were moving faster than most bergs. They decided to investigate. They said they would see us later in the day, but we never saw them again. We did see icebergs and didn't envy our friends the job of keeping track of them.

SECOND DAY

The second day started much like the first. It had snowed all night, but by morning the snow let up and we found ourselves in the clouds. We were beginning to pick up ice. This wasn't disturbing. We had been flying the worst weather all winter to learn the effects of ice on an airship and found it was not a big problem. The most adverse effect was probably that of additional weight. What did concern us was that we were beyond range of accurate radio navigation and had been unable to get any star sights. Of course, we had been keeping a dead reckoning position. But the wind had seemed stronger than predicted and, if such was the case, we should be getting close to the Azores.

Just before daybreak, we saw lights below and ahead. We hoped they were on a ship, but feared they might be on the coast of an Azore Island. If so, we were in an unhealthy position. Some peaks in the Azores reach well above 1,000 feet—our altitude. We had to go up to clear any obstacle, or down to identify the lights. Going up would be unprofitable. We still would not know where we were if in cloud. So, down we went. In a few anxious minutes we broke into the clear and learned the lights were those of a ship. There was no land in sight.

A few hours later, we regained radio navigation by use of stations in Europe. After only 32 hours, we were already northeast of the Azores—ten hours faster than the best of our "paper" flights. We were really riding high!

Good fortune didn't last. Two hours later, time had come to make a decision; either continue on an easterly course, or turn southeast toward Portugal. Strong winds were supposed to blow from the south. If we turned toward Portugal, our groundspeed would be greatly reduced. However, if we continued east toward Europe, we could easily run into stronger headwind when we reached the coast and turned south. We decided to head toward Portugal.

There weren't many bright spots the rest of that day. The wind continued on our nose. Forward progress was very discouraging. Forecasts from several sources were all the same. Nothing for us to do but stand watches and hope.

The author is greeted by his wife, Donna, at the end of the world's record-breaking flight.

THIRD DAY

Just after midnight I heard the radioman making his position report. He began, "This is the first report of the third day—" and so it was. Spirits were high in spite of the fact that we still were not making much headway. Our entire flight plan was based on the premise that we could maintain a groundspeed equal to our airspeed at all times; i.e. with no headwind, we could fly across the Atlantic and back. If we did get headwinds, we would have to find tailwinds to counteract them or our flight would end in failure. The crew was well aware of this as was evidenced by a tension which showed in the form of nervous humor.

About noon, we passed over a British Corvette headed toward England and its crew seemed surprised to see an airship so far away from America. Late that afternoon the wind abated. We had burned enough fuel to allow us to go to single engine operation. Thus we could extend our range. Already we had demonstrated the practicability of cruising a ZPG-2 type airship nonstop to Europe. No one would condemn us for landing and refueling. Our portable mooring mast was aboard the Super Constellation which had just left the Azores for Africa. In a few hours we could be in Lisbon, and by morning at Port Lyautey. My problem was—should we play it safe, land and make news, or try to recross the Atlantic and make history?

I checked everything on the ship. We had started with 22,000 pounds of fuel and had a little over 9,000 remaining. We had used 13,000 pounds in three days and it would take at least six days to reach the United States. We had been using two engines until now, though, and we could expect to do much better while using only one. In fact, as I checked, we were using only 65 pounds per hour, and I hoped would use less when we decreased our static heaviness. I checked the weather map with Dehn and our chances of favorable winds farther south. Things looked slightly in our favor, so I decided that from the tip of Portugal, we would set course for Casablanca and then head home.

As I was preparing to go on watch at midnight, there was a slight commotion on the lower deck. I climbed down the ladder in time to see the radioman setting up the portable signal light. I looked out into the darkness ahead and saw a small white light blinking madly, "What Ship?" When we answered that we were a Navy Blimp, he promptly replied that he was an Army MSTS vessel out of Gibraltar and hastened to add his relief that we were a blimp. Our running lights were the same as any surface ship and we were on a collision course with him! He was right, too; because in a few minutes, we passed directly over him!

FOURTH DAY

It was dawn when we passed west of Casablanca. Weather was much warmer and all had started the fourth day by changing into summer flight clothing. The warmth of southerly latitudes was reflected in the spirits of everyone. We were proud that we were already off the coast of Africa despite the fact that we still had a long way to go. The complete confidence of the crew was demonstrated when Ed Moore leaned out the gasoline mixture a bit too far. Our only engine sputtered and coughed before he could add a little fuel. Everyone tensed and some even started for their ditching stations, but the engine caught again and ran smoothly. Nobody cussed Ed. All knew our success depended on squeezing every bit of energy out of the gas that remained and we expected the flight engineer to do it.

At noon, we started the starboard engine and stopped the port. It was time for a maintenance check on the

port engine and a change of plugs. As soon as the engine stopped, our two mechanics tore into it. It was a joy to watch them work—never a wasted motion, their movements were a symphony of action, so smooth and so efficient. In only 2:20 hours they had completed the job and the engine was as good as new.

The *Snowbird* was designed to carry only 75 gallons of fresh water. We doubled that but, aside from galley needs, even this allowed us only a gallon apiece for an entire ten days. We hadn't set up formal water rationing but the cook kept track and reported to me daily. By noon of the fourth day, we had used only 30 gallons. Our daily toilet consisted of a cup of water to wash our teeth; a half cup to wet a washcloth to sponge our faces. We used a waterless cleaner to wash our hands; this left half a cup which we would sip—pure nectar!

Before sunset we saw a point of land, Cape Jube, and noticed a small village and a fort at the water's edge. There was also a small airfield, but no planes. It was the first land to which we had been this close since leaving South Weymouth. We were not sure of its nationality or how the population would feel about a strange blimp, and felt quite tense as we neared the shore. Commander Hoel, who had the binoculars, pulled the stops when he said, "No one seems to have a rifle."

The natives were excited. The whole village turned out to greet us. We passed over the edge of the fort and waved like mad. It was a welcome break from our routine. At sunset we were still west of the African Coast and saw several steamers traveling the same route. Evidently, the Suez situation was causing many of them to detour around the Cape. It was a beautiful evening, but the most welcome part of it was the slight tailwind we finally found.

FIFTH DAY

Everything was routine to start the fifth day. Each member too had his own routine—correspondence courses, chess, books. I spent my off-duty time studying a book on piano playing. Radio communications were exceptional. We talked with our families by a combination of radio to the base and telephone from the base to home. It was a thrill to call home from above the Canary Islands. I called my mother in California. The radioman at the base briefed her on how to say "over" when she was through talking. I told her where I was and that things were fine and asked her to tell me how she was. All she could say was, "Hello, Jack, over." And I just couldn't get her to say anything but "hello" and "over."

Now we were burning only 48 pounds of fuel per hour. Groundspeed was over 40 mph. We were getting better than five miles per gallon of gas. At that rate, we could easily break the existing record for nonstop, non-refueled flight. At eight p.m., we sighted the Cape Verde Islands. Nearest land to the west was Puerto Rico, almost 2,500 miles away. At 600 miles a day, it would be four days before we would see land again. There was a lot of water ahead of us, but we were committed—all or nothing. At dark we lost our tailwind. We contacted the Connie and told them to proceed to Lages, and from there to Bermuda to await further instructions. We knew they would be able to get good weather information at both places.

SIXTH DAY

The sixth day produced a headwind serious enough to make me refigure our fuel consumption. It seemed we had plenty to make Puerto Rico, but every hour of headwind was a serious threat. What a spot to be in—too far to turn back and too far ahead to nearest land if the headwind persisted. Just then the radioman brought a message from the base. "The PIO desires you land New York at finish of flight. It was intended to announce the flight publicly as soon as you have broken the existing record of 200 hours. What is your comment?"

We replied simply, "Wait." They were more optimistic than we.

At noon we tried to clear out the plugs on the port engine. It backfired and almost quit. Fitz started the other engine. The mechanics again did the job in slightly over two hours. They were terrific. They had practiced every detail day after day before we took off and it really paid off. After lunch, Dehn, the weather guesser, and I tried to figure why our headwind? We knew the wind should be from the east on the lower side of the Bermuda High, and finally concluded the westerly wind must be a local surface situation. We were at 700 feet beneath broken clouds. By day, at this altitude, we could measure ground speed by the time it took our shadow to pass over a whitecap or patch of seaweed and keep a running plot of our estimated position until we could get a definite celestial fix at night. We decided to go higher at sunset and take a fix as soon as possible. We could take another an hour later and learn whether we had gained a tailwind at the higher altitude. Making a decision is always a good feeling. I passed the word regarding our plan. Dehn mentioned that his birthday was coming up. I made a mental note to see about a party for him.

Shortly after dark, we climbed to 4,000 feet and Eadie made preparations to take a star sight. Our first celestial fix of the evening was always a big event. Everyone crowded around the navigator to see how well we had done during the day. Tonight, the second fix would be important too. Was our theory of favorable upper winds valid? The answer would have to wait. I climbed topside and was soon sound asleep.

SEVENTH DAY

As I took over the watch beginning the seventh day, Eadie told me that our theory had paid off. We had a seven knot tailwind. Stan Dunton, the navigator on our watch, took his first sight and confirmed Chuck's news. When the sun came up, we could see wind streaks on the surface and decided they were headed our way. This was good. We could descend beneath the broken clouds to take advantage of the shade they would afford. This was important. Sunlight beating on the huge envelope heats the helium inside. When helium gets hot, it expands and one must valve to keep the pressure low enough to prevent bursting the envelope. Valving helium, of course, means loss of lift which in turn means using more gasoline to stay in the air.

We descended to 1,000 feet and still had our tailwind. At this rate we would reach Puerto Rico ahead of schedule!

I talked with Locklear about cake frosting on a cardboard box for Dehn's birthday. He insisted he could bake a real cake if we would keep Dehn busy on the lower deck when the time came. This was typical of the spirit of the entire crew—competent and cooperative. If I had to decide which one person could have been eliminated, I couldn't do it. Each man contributed something vital without which this flight could not have been a success.

EIGHTH DAY

An interesting message from the base kicked off the eighth day. They had learned that the longest flight ever made by a dirigible was 6,880 miles, when the Graf Zeppelin flew from Friedrichshafen, Germany to Tokyo, Japan, in 1929. Indications were that we would break that record about the same time we passed the 200 hour mark. This was something we had known when we took off—the prospect of breaking two records. The navigator began to check our total mileage so we could make note when we had reached 6,880-mile mark.

Shortly before dawn, we saw the first indication of humanity we had seen for three days—a light which seemed to be on a ship. As it approached, the blinking of a signal brought the familiar query, "What ship?" We answered "U. S. Navy Blimp." They then blinked, "Italian *Sorriento*," and tried to send greeting. We could not understand Italian and they couldn't understand English, so, after many unsuccessful attempts, they haltingly flashed, "Good trip." Not to be outdone, we spelled out the French words, "Bon Voyage," as their running lights faded to the east.

With the coming of daylight we saw signs of a cold front. Flying in turbulence we had to add more power to maintain positive control. Since we had to pay the penalty of using more gasoline, I decided to take full advantage of the situation and pick up water ballast from the ocean. We had used enough gasoline to become statically light. If we were to shut off our engines, the airship would rise, but extra power was being required to keep the airship in level flight. General quarters was sounded and the word passed to rig the ship for water recovery.

The water pick-up maneuver is always tricky. The airship must be flown close to the surface and a large canvas bucket lowered by a cable on a winch. When the bucket strikes the water, it submerges and fills. Then the winch operator reels in the cable hoisting the water to the car. Meanwhile the pilot heads the ship into the wind and slows to zero speed.

(Continued on page 70)

There's a gold mine in the night sky for the fixed base operator who utilizes his facilities around the clock and sells flight instruction after sundown.

Night Owl

By ARTHUR L. SPARKS *

IF YOU'RE GONNA be a huckster you gotta tend store when the customers can come and you gotta have merchandise to sell," the oldtimer at the corner grocery assured me one winter night when I tramped out in the blizzard to get a pack of cigarettes.

He knew his onions. Early in my huckstering career—I was a fixed base operator at the time, 1947—I suffered from the ups and downs of seasonal activity just like almost every colleague in the community aviation business.

Then, one day my banker discovered he was financing a project patronized by week-end customers only from October till April. Forthwith, my prospects of floating further loans became dimmer than a hermit's dreams. I had to sit down and ponder my lot with a view to improving its basic formula, or fold my wings with a bow to the keepers of the vaults.

Hutchinson, Kan., is in the center of the State, about 200 miles from the western edge of the central time zone, but, even in this favored position, darkness falls rapidly from early autumn till late spring. This created a situation 180 degrees contrary to the interest of fixed base operation. Ninety per cent of my students and aircraft renters worked all day. In summer they could fly in the long evenings but from October till April only on week ends. I couldn't eat much or for very long with the income of that procedure.

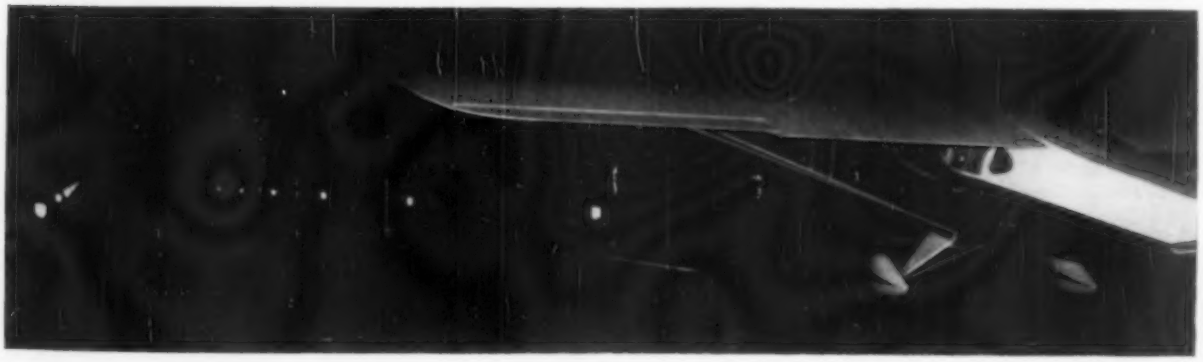
The answer seemed pretty evident. I had to stop training eagles and start training owls. Just like the man at the corner grocery said—"You gotta tend store when the customers can come and you gotta have merchandise to sell."

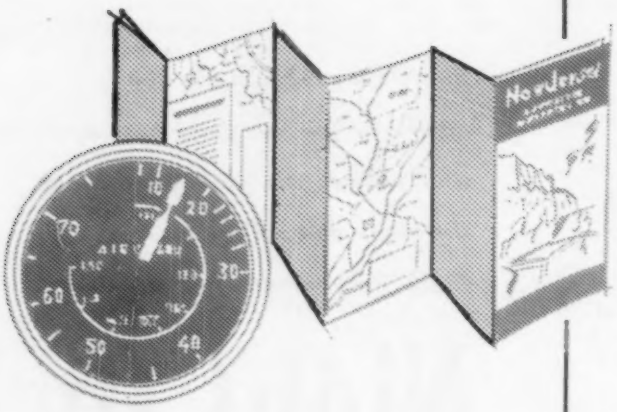
My plan of action was highly favored by the physical plant at Hutchinson. The Municipal Airport had been taken over by the Navy as an outlying field for PB4Y's early in World War II. Modern, flush-type lighting along with four, five and 6,000-foot runways, floodlights, a control tower, a lighted wind tee and a complete CAA facility was maintained on the field.

Night flying had always held a certain fascination for me. I see no reason to consider it any more dangerous than day flying, except away from the lighted airways over rough country. Here, even daylight forced landings can be hazardous. Reliable equipment, day or night is, of course, the answer. This we had. The unknown quantity at this point was the student's reception of the proposal. A meeting called for discussion of regularly scheduled night operations evoked their enthusiastic endorsement.

Batteries, wind generators, navigation lights and flare kits were immediately installed on three Champs and a Chief. A Luscombe 8E was already so equipped. A single plug-in type landing light was installed in each plane for emergencies only, except for being used for one landing to end each instruction period as a sort of "dessert" after an hour of "black" landings with runway lights alone. Each student was given a complete briefing on the use of the flare kit, emergency light procedure and a general dark cockpit checkout. None of the students had had any previous night flying experience, although their log books read from three up to 100 hours of solo time. One factor in particular proved to be a valuable asset both to the student and to myself. In this part of Kansas the wind is highly erratic. A solo student off in an eight-knot wind, an hour later may have to fight the plane down in a 40-knot blow with strong gusts. To protect the student and the equipment, power approaches with wheel landings were always given during the fourth hour after daylight solo, until mastered. By "pushing" the student into what has usually been considered an advance exercise, we gave him skill and instilled in him confidence that he could get the plane back on the ground and keep it there, even in winds too strong to taxi. Since the higher the wind, the lower the ground speed, this skill is particularly useful on small fields. Night and (*Continued on page* 81)

**A lawyer before WW II, Mr. Sparks served as WTS instructor and Naval Aviator before forming Sparks Aviation Enterprises in 1946. He sold his business in 1949 to study international law at the U. of London. In 1954, he returned to the practice of law in Biloxi, Miss.*





Helicopter on Instruments-

NECESSARY OR NOT?

By THOMAS W. ANDERSON

Helicopter Research Pilot,
James Forrestal Research Center, Princeton University

THE NEED IS PRESSING to resolve a norm for helicopter flight under conditions classified as instrument weather for fixed wing aircraft. Presumably, pilots and operators of helicopters are in the best position to state the case and come up with the answers. And indeed, many papers have been written on the subject. There seems to remain, however, a sort of no man's land in all the speculation. Should helicopter operation conform weatherwise to standards established for fixed wing aircraft? Or should a new concept be evolved to fit the unique capabilities of the helicopter?

To anyone who was subjected to the bewildering accumulation of unnatural activity involved in instrument flight training, as I was, and condemned to apply these mental and physical gymnastics in battling the elements for 20 years, it would seem a crime to foist the business off on coming generations of airmen. And is such a heritage really necessary to helicopter flight? I have flown the rotary wing consistently now since 1947, for the past five years as a research pilot, and I claim it is not.

It is said that the helicopter must embrace all-weather operation to compete with other forms of transportation—that the truck and bus ignore weather but that, currently, the helicopter rarely ventures out at night and never in storm, day or night.

But this is not quite accurate. In the first place, the truck and bus do not completely ignore weather and frequently pay a heavy penalty to it. In the second place, the helicopter has no unique problem in operating at night when special permission is granted by the Civil Aeronautics Administration.

But how far can the helicopter go in weather flying? Out of considerable experience in this regard, let me cite a recent incident. At 0700, I took off from the Forrestal Research Center's flight strip near Princeton, N. J., for a routine data recording project with a non-pilot technician as observer. Having no directional requirements, I flew an arbitrary northwest heading, principally because it kept the sun out of my eyes. After 40 minutes, I completed the items on my flight card and prepared to return to base. On the route out I had paid scant attention to weather or visibility since they were only secondarily my problems at this time. Swinging around now toward home, I could see that my reciprocal course was fogging in. I dropped down from 1,500 feet and elected to swing around the fog area but it was not long in spreading. The condition gave me less than 100 feet of visibility at scarce more than tree top level. I met this simply by reducing indicated airspeed to some 15 or 20 knots and was able to maneuver around any obstacles which appeared in my flight path.

Proceeding thus, I eventually came upon a highway where automobiles were crawling along with headlights lit. The glare of the lights against the fog made it impossible for my observer to identify the highway or read the signs, so I sat down on a lot near a home under construction and the observer asked a carpenter for highway directions to Princeton. It was a simple matter to arrive home, although at no time did I have any more ceiling or forward visibility. There was no sweat in the whole procedure, due entirely to the fact that no fear was involved. I just probed along like the automobiles, knowing, like them, I could stop any time I wanted or could sit down safely in case of a forced landing due to mechanical cause. There was nothing in the least remarkable about the experience. It simply illustrated a normal use of the characteristics inherent in the machine I was piloting—low and slow.

And this, in my judgment, should be the foundation of the philosophy upon which helicopter regulation and pro-

Simplification of helicopter flight rules would go far in promoting the full utility of the rotary-wing craft.

The James Forrestal Research Center and airstrip at Princeton, N. J.

The author, a veteran rotary-wing pilot, and his 'copter.

cedure is based. The pilot has the responsibility to capitalize on the inherent capabilities of the machine to the fullest extent within the bounds of absolute safety. To do less is to deny progress—a dangerous attitude for any person or government in this dynamic age. At long last man can fly under conditions never before possible and can do it safely and profitably. This capability should have the greatest freedom with due consideration for all related forces and factors.

Situation would seem to be a key word in consideration of helicopter procedures. Heavy snow, icing conditions aloft, hurricane and tornado activity—these are situations with which the helicopter can not cope—nor is it unique in this respect. But where it can maintain a degree of visual reference, the helicopter can go in any weather the machine will endure. It can do it with existing instruments, as I and many other helicopter pilots have demonstrated time after time.

From the standpoint of commerce, the conclusion is that passengers and cargo can move around the clock in 1958. Why may they not? Principally because of the deep ingrained consciousness of the problems of fixed wing operation. It is a considerable mental exercise to transfer concentration from high speed and long runways to low speed and heliports. When this concentration is expressed in legislation and regulation, the transfer is even more onerous. Moreover it is against the built-up consciousness of pilots themselves to turn attention to low and slow flight when their entire engrossment over the years has been in the opposite direction. And helicopter pilots have a special angle—many dislike the autorotation possibilities under 500 feet, even though most helicopter charts show that, at 20 knots indicated, safe landing can be made from 50 to 75 feet.

Reason must prevail in low and slow flight just as elsewhere. When minimums of visibility can not be maintained, the pilot must sit down. But that is his built-in alternative. Insofar as minimum altitude is concerned, I suggest the outer limit of "ground effect" for the particular helicopter concerned—on the order of 30 or 40 feet normally. And insofar as forward speed is to be considered—it should be governed entirely by the extent of visibility prevailing. An analogy would be the care a driver must take at night to make sure that his effective headlight range is not overrun by his speed. Another consideration of forward velocity is a speed consistent with an altitude from which a forced landing might be safely executed. At the present time, 20 knots could be considered a possible minimum. Fair controllability still exists at this speed, and less than perfect control could certainly be tolerated for a short time in adverse conditions. I would not suggest inauguration of a two-hour scheduled flight where weather indicated holding 20 knots throughout. Minimums are for use only where required to sustain a dependability based on reasonable projection.

In an analysis of operating conditions for the New York area, the Port of New York Authority's booklet, "Transportation by Helicopter, 1955-1957," shows that only during 19 per cent of the time is a ceiling of less than 2,000 feet to be expected. Only about 2 per cent of the time do ceilings of less than 200 feet prevail. This is readily seen to be a very favorable background condition for helicopter dependability. I venture that, across the country, adequate helicopter visibility is available 98 per cent of the time. No form of transportation gives 100 per cent weatherwise service but the helicopter can be right up there with the best of them. Naturally, I do not suggest that near to zero-zero operations be conducted under VFR flight regulations over metropolitan areas. (*Continued on page 78*)

Ten-gallon hats and mink coats are right at home in the new business terminal which adjoins a 700-foot complex of four storage and service hangars. In the Flight Operations room, the facilities include an aeronautical wall map, map table, direct phone lines for filing military and civil flight plans, customers' lockers, and 24-hour service. Stairway in the main lounge takes the visitor to the Flight Deck restaurant.

BUSINESS

Aviation's fastest growing element comes into its own at Southwest Airmotive's new terminal.

Made of concrete and steel, with buff brick exterior and white cut stone trim, main building has unique upswept line.

The $4 million Southwest Airmotive business terminal and hangar layout, showing two hangars to be completed this spring, and planeport at rear.

FLYING TERMINAL

WHEN LOVE FIELD at Dallas, Tex., racked up its record last year of 101,482 civil itinerant aircraft movements—almost twice that of any other airport—there had to be a good reason. Service of business aircraft by the field's several major service companies would appear to be the answer. And 25-year-old Southwest Airmotive, largest operator on the field, has left no stone unturned to put a capital "S" on Service, symbolized now by their new quarter-million-dollar business flying terminal.

Latest addition to the $4 million Southwest base on the southeast side of the field, the two-story structure contains an elaborate oak-paneled central lobby; rental car concession counter; "VIP" visitors' office and lounge; recessed display case for products; and a flight operations department with wall-covered aeronautical map, map table, sliding-door lockers, and direct lines for filing flight plans and securing weather reports.

Southwest's refueling crews have an office and headquarters room overlooking the 12-acre ramp, plus locker and shower room. Three shifts assure service around the clock, seven days a week.

Modern, free-hanging stairs take the visitor from the lobby to the second floor Flight Deck restaurant and coffee shop overlooking the airport. Open from early morning to late evening, the restaurant will serve the general public as well as customers and employees.

Main lobby has Southwest's emblem in the terrazzo floor.

RE: AN OPEN LETTER

EDITOR'S NOTE: In the January issue of FLYING, we carried an editorial entitled, "An Open Letter to the Congress". This editorial was not a technological exposition of our national dilemma but did concentrate on its underlying causes, bluntly: statecraft inadequate to the air age, the malfunction of politics and education, and second rate citizenship.

Why should FLYING bring into the cockpit such deep concern over these matters?

The answer is quite simple. Aviation and airmen, from the vantage point of unique experience and outlook, have an especial responsibility to the country. The history of American airmen is one of proud dedication. No force as potent and far reaching as flight can serve the cause of human society unless it is articulate and forthright. Nor could the real reasons for the threatened eclipse of the United States and the free nations in the air age be avoided.

Reader response to the editorial has been in the proportions of an avalanche—far beyond our ability to make individual reply. It has come from every state in the union and every walk of life, from individuals and organizations, officials and private citizens. It has been a heartwarming experience to realize how precious is the heritage of God and country to thousands of men and women who evidently have some stake in aviation since they read an aviation magazine.

It is patently impossible to reprint even a cross-section of letters. Some are brilliant editorials in themselves. The writers should be sitting in my chair. All we can do is extract a few lines here and there from an occasional letter in the hope that the sum total of the fragments will reflect how deeply concerned is the airman with the destiny of his land.

A PHYSICIAN:

I would suggest that, in addition to effective defense, we expend a great deal more effort to find some basis for peaceful approach to the Russian people themselves. I do not imply any sense of appeasement but am deadly serious in suggesting that qualified psychiatrists might be very profitably employed in the State Department to seek an effective means to this end.

A JET BOMBER PILOT:

I'm a B-47 driver. When I was 17 and about to enter college to study aeronautical engineering, my late father pleaded with me, "Son, please reconsider this thing." I could have cried for him. Through two great wars and the accompanying decades, he never came to grasp the awfulness of the silent contrails in the sky. He was a student of contemporary history but it meant little to him. It seemed beyond him to conceive of a man who might be almost equally well acquainted with the five continents and the seven seas. Much as I loved him, it is the likes of him in our national government who are authoring the eclipse of our nation.

A GEOPHYSICIST:

It appears to me that the moral fibre of our people is so corroded that government cannot escape reflecting that corrosion.

A BUSINESSMAN:

Strong national leadership is demanded by these times. I would rather break my back paying taxes than break it wielding a shovel in a salt mine.

A MANUFACTURING EXECUTIVE:

No nation or people is stronger than its educational standards. But reform of American education will be unavailing unless it starts at Grade 1—and back of that in the education of the teacher—if we are to have the scientific knowledge required for the space age.

A METALLURGIST:

It is surprising how few U. S. scientists really study Russian technical literature—even though it's translated and within their reach. Nor has there been any increase in this matter since the Soviet satellites were placed in orbit. Had there been, there would have been a clear understanding of the growing Soviet superiority both in industry and science.

AN AVIATION WRITER:

Since your Open Letter to Congress was received, the Gaither and Rockefeller reports have been issued. While the Gaither report has never been made public, it was, from all rumors, about as frank as your editorial; and certainly the Rockefeller report was a stop, look and listen warning.

A YOUNG ENGINEER:

I am just now receiving my degree in mechanical engineering, but as I see it our national problem is not primarily one of technology. It is one of moral inconsistency.

TO THE CONGRESS...

Politics and corruption have become synonymous to American youth. Our society has a perverted sense of values and could panic at any time. Our capacity to grasp its significance has fallen far behind our scientific progress. The quick buck is God. Don't misunderstand me. I'm not a collegiate radical, but neither can I fail to recognize that we are fed with propaganda designed to keep us in mental stupor.

AN INDUSTRIAL EXECUTIVE:

At first I thought you were only going to lambaste Congress for being impotent, but then you rightfully accused the United States citizens of "palsied patriotism, materialistic self-interest, class antagonism and intellectual apathy." Your charges are well taken. But if we can take seriously the danger signals that Russia is ahead of us in some scientific fields, and if we change our ways, our Republic is going to be safe for another 100 years or so.

A MISSILE EXPERT:

I am appalled at the waste of money I see at every turn. I do not think the Soviet scientists had any nuclear power at their command in raising the satellites. I feel they did the job with the same elements that have long been available to us.

A SOUTHWESTERN ATTORNEY:

I have been gravely concerned by the failures of our national leaders to recognize the real problems that face the country, and their standard budgetary answers to every problem that arises.

A RESEARCH SCIENTIST:

My chief interest centers in research and development. We, as a nation are definitely in trouble—from within more than from without. Innovations are very hard to sell, especially if the "experts" cannot comprehend. A plan should be arrived at where we, and such as we, could have a hearing and stand or fall on our merits.

A PRIVATE PILOT:

I've accumulated some 900 hours as a private pilot. I'm under the conviction my breed is too smug about the air environment—and the same goes for the lightplane manufacturers. We do a lot of hollering about our rights, but I don't hear much about our responsibilities as American citizens with special knowledge of aviation which broad segments of our people could use with great profit to the country. Private citizens and private industry can move faster than government. Isn't free private enterprise a two-way street, or don't we really mean it?

A CLERGYMAN:

This is a plea for a "people's translation" of your straight-forward Open Letter to Congress. Intellectuals understood. Did anyone else? Khrushchev put his case thus, "We've already won over you. The people of the United States now living never fought on their own territory. They do not understand war. The next war, if there is one, will not be fought in Africa or Europe or Asia but from the very outset it will be fought on United States soil. The United States is the country of the main adversary."

How about saying, "Freedom never before demanded such a price from me—but the price is right. I'll buy."

A CHICAGO ATTORNEY:

The situation analyzed in your editorial cries out for some organization dedicated to assure that our political leaders, with scant personal opportunity to keep abreast of the air environment, be continuously briefed in this respect. If such a unit is ever activated, kindly consider this letter as a request on my part to serve in any manner indicated.

A KOREAN VETERAN:

Irony of ironies—the very people who yesterday refused to recognize the validity of strategic airpower as a force to prevent war are now screaming for missile mastery.

AN AIRCRAFT STRUCTURES ENGINEER:

I'm a kindred soul with you. I've written a hundred Letters to the Editor in the past three years, always repeating the point you bring out about airpower, socialism, American constitutional government, progressive education, race relations, God, communism, and patriotism. I haggle with anyone, regardless of background, education or position. I'm staggered by the abysmal ignorance of our people. Every now and then some of it sinks in and someone says, "What can you do by yourself?"

I feel the same way you do, and believe me it's a real relief to know that if I do get clobbered I'll know why. Edward Everett Hale said it for me in his poem, "By the Grace of God":

I am only one, but I am one;
I can't do everything, but I can do something
And what I can do, that I ought to do.
And what I ought to do,
By the Grace of God, I will do.

Gen. Carl A. Spaatz, called the greatest air strategist of history, became chairman of the Civil Air Patrol, an air youth organization, upon retirement as USAF Chief of Staff.

Thomas A. Lanphier, one of the great fighter pilots of World War II and a manufacturing executive, has long been the devoted president of the National Aeronautic Association.

"Jim" Doolittle has shared his life as fully with civil aviation as with military. He doesn't care what you call him as long as you make sense—sense for the country.

AIRMAN'S ALBUM

Alexander DeSeversky, pilot, patriot, analyst, was a combat casualty when most airmen were still in short pants. He never backs up.

"Curt" LeMay is here out of dress—no cigar. Never a civil airman, he yet promoted the organization of more private flying clubs in SAC than any civilian ever backed elsewhere.

THIS COULD HAPPEN TO YOU!

SO YOU WANT to make aviation your career? Well, good for you! But you should know beforehand that you may land smack in the middle of national and world problems and be called to prove your case before such salty economists as Senator Harry F. Byrd of Virginia (and thank the Lord for such Americans as he).

The airmen on this page surrounding the Senator with his copy of the Federal Budget in one hand and a model of the Jupiter C in the other, are not in exceptional position, however. Every airman, great or small, testifying before the Congress or in conversation with his next door neighbor, should be articulate with the knowledge and insight born of his experience. There are strong men and there are silent men, but there are no strong silent men except in fiction where they belong.

Two generations of Donald Douglases lay it on the line as they always have in the good old American tradition of free private enterprise as well as in government business.

Maj. George E. A. Hallett as he appeared in the year 1919.

FOREWORD

Authentic aviation history for public consumption has been rare. Most of what has been written is not very knowledgeable and, as second hand information, has dealt with hero worship and mere adventure. The result has been a lack of public concept of the real processes of development and therefore a lack of appreciation.

Readers of FLYING *will have noted the policy of the magazine to place authentic history in their hands. Such articles as* "Concept, The Key to Airpower," "Memories of a Pioneer," "The Walden Story," "Cowboy at Farnborough" *and others have been researched and published to this end.*

"Pioneer Mechanic" is another such article. Compiled from the testimony of participants still living, it sets forth the origin of much basic engineering as well as the ingenuities and vicissitudes of the early mechanics, a breed too little noted and unsung. Any veteran pilot will testify they were worth their weight in gold and rugged and fearless to a fault. The bond between the early pilot and his mechanic was something on the order of that between David and Jonathan.

—The Editor

Much has been written of the derring do of early aviators but we seldom hear of the men who kept them flying.

Pioneer Mechanic

By BRUCE REYNOLDS

WHEN WORD OF KITTY HAWK reached the west coast, it instantly triggered the imagination of a California boy—George Hallett. He, too, must fly! His idea was to mount wings on a bicycle. As the wings began to lift, they were to tighten a belt and turn a pusher propeller. Initial impetus was to come from coasting down a steep hill.

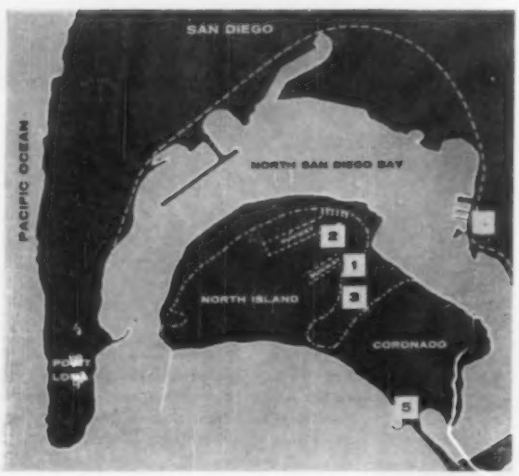
This, and other unavailing ingenuities brought the boy only bruises but prepared him for the unforgettable moment when eventually he first saw a man in flight—Charles K. Hamilton in an exhibition at the Coronado polo grounds, July, 1910. George was determined to examine the Hamilton craft in detail and did not have long to wait. The pilot had a forced landing outside the field and Hallett, with tools sticking from his coverall pockets (he was an apprentice mechanic), dodged the police and joined the ground crew at the plane. The crew themselves soon chased him but not before he had devoured much of the construction detail of the flying machine.

Shortly thereafter, Hallett met two local fliers, B. F. Roerig and C. F. Walsh, who had their planes based near Imperial Beach, six miles south of San Diego. He met Roerig at his place of work, the Baker Machine Company, located on the waterfront in San Diego. Roerig had copied from photos a Farman pusher-biplane, with a six-cylinder Cameron automobile engine, and was constructing it on the Baker premises. Hallett was thrilled at the invitation to have a hand in the project. Walsh, also from photos, built a Curtiss pusher-biplane, powered with an Eldbridge three-cylinder, two-cycle engine.

The boys always flew near sundown, when the air was calm but none-the-less the machines received innumerable broken wing tips and sundry fractures of gear. On week ends, Hallett would take the boat from San Diego to Imperial Beach and lend a hand, especially in tuning the engines. During that winter Walsh also built another Curtiss type which he powered with a MacComber rotary aircooled engine produced in Los Angeles. This plane was remarkable in that it succeeded in flying with four people!

Charley Walsh left California in the Spring of 1912 to work for Curtiss as an exhibition flier. They gave him a new pusher-biplane with an eight-cylinder model, 4x4 engine of 60 hp. It was a single rocker-arm type but made its appearance long before the famed OX model.

The Curtiss Exhibition Company made all exhibition arrangements and, in turn, received a percentage of profits. However, Walsh's career ended abruptly at Trenton, N. J.



Broken lines indicate coastlines of San Diego Bay and North Island in 1911. Numbers indicate: 1, Curtiss camp, 1911; 2, North Island Army camp, 1914; 3, Spanish Bight, 1911; 4, Baker Machine Co., 1911; and 5, the Coronado Hotel in 1911.

on October 3, 1912, during the State Fair. To quote "Aeronautics," "he was spiralling in a thrilling, sensational flight, when his left wing collapsed."

But let us return to George Hallett in San Diego. In the Fall of 1910, Glenn Curtiss had arrived in San Diego with plans for developing a seaplane. He had been in Los Angeles in January to compete in the Dominguez Field Meet held by the L. A. chapter of the Aero Club of America, and the good flying weather lingered in his memory. So he left Lake Keuka and his native Hammondsport, N. Y. when winter approached. The balmy weather near San Diego was a more practical location to continue seaplane experiments.

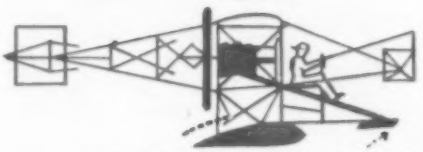
In spite of his fame, Curtiss seemed always in financial difficulties and was hard-pressed to bring two of his organization, John D. Cooper and W. J. Shackelford, along with one crude hydroaeroplane and two land aircraft. All three craft were pusher-biplane types. It is of interest to recall that Curtiss's 1909 Rheims Gordon Bennett Racer was his first aircraft featuring a wing covered on both sides. The hydroaeroplane Curtiss now brought for use in the experiments at North Island was of this newer type.

In November, 1908, Curtiss had fitted his "June Bug" with twin floats and tried to fly from Lake Keuka. It didn't work. The pontoons were not designed to "plane" on the water. Curtiss now wasted no time in deciding on a base for further hydro experiments and in organizing a flying school. He chose the flat surface of North Island, which at that time was roughly two miles long by one and one-half wide, and lay about a mile due west from San Diego. He rented this natural airport and seaplane base from its owners, The Spreckels Company, for $25 a year. The shore of the island facing San Diego featured a sheltered bay known as Spanish Bight. It was in the Bight that Curtiss conducted his hydroaeroplane experiments. The cove has long since been filled by the Navy to enlarge its facilities and only a handful of airmen now living recall the scene where Navy seaplane design was first nurtured and developed. Here on North Island trained such early Army and Navy fliers as Beck, Brereton, Ellyson, Kennedy, Goodier, Park, Towers, Walker—to mention a few.

To transport men, airplanes and equipment from the mainland to North Island, Curtiss needed a power boat and local dock facilities. He found both at the Baker Machine Co. Bob Baker rented him a boat and dock space. Along with the latter, a bit of Baker property was borrowed—one George Hallett. In addition to Cooper and Shackelford, Curtiss needed experienced mechanics. He found Hallett, who was now Baker's foreman, with aircraft and engine experience, a valuable addition to his team. Curtiss was also now joined by the famous Hugh Robinson. The Spreckels Co. had built a hay barn on North Island and this was used as a hangar.

HALLETT relates: "The airplane used in the hydro tests was set up on the beach of Spanish Bight, close to the old barn. It was first fitted with experimental parts brought from the Curtiss factory at Hammondsport. The original design consisted of one main float, made of tin over a wood frame. A small tin float was placed where the front wheel was normally located. To help lateral balance, flexible shingle-shaped pieces of ash wood, about four inches wide were placed under each wing tip to act as 'planes' to keep the wings out of the water. The 'shingles' worked well under way but flotation was needed when the plane was hove to, so inflated bicycle inner tubes were fastened between the 'shingles' and the wing. The main float, however, 'ploughed' because water flowed over the top of it, so an extension to its forward end was made of wood and canvas. This added needed planing surface, but the high center of thrust shoved the nose float under, so a planing surface ahead

ORIGINAL HYDROAEROPLANE

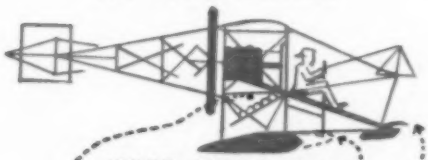


ASH "SHINGLE"

SMALL TIN FLOAT

MAIN FLOAT APPROX. 4' WIDE

1ST MODIFICATION

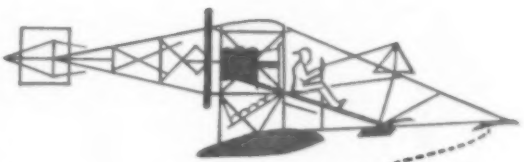


WOOD AND CANVAS EXTENSION

INFLATED BICYCLE INNER TUBES FASTENED TO "SHINGLES"

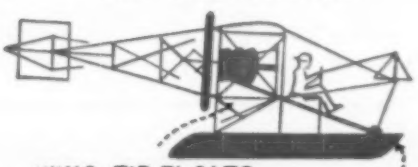
PLANING SURFACE

2ND MODIFICATION



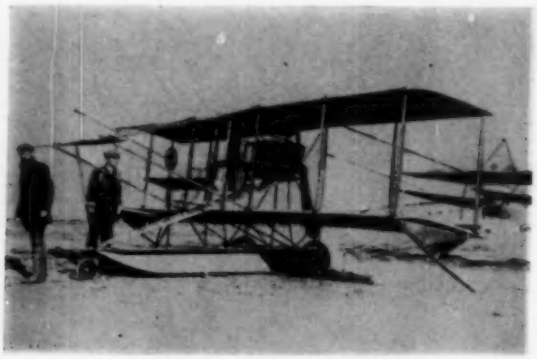
LARGE PLANING SURFACE MOUNTED ON BAMBOO STRUTS OF FWD TIN FLOAT.

3RD MODIFICATION



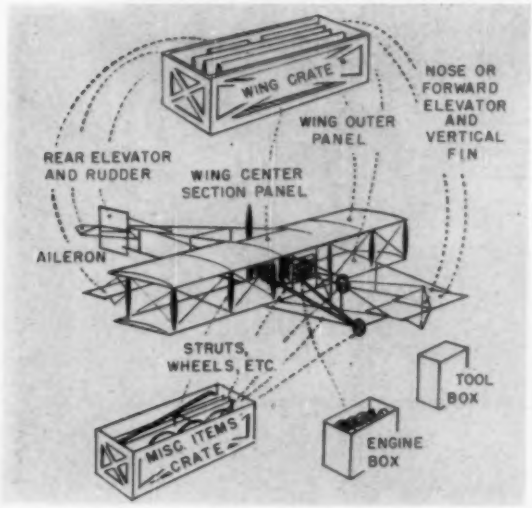
WING TIP FLOATS CHANGED TO THIS SHAPE RECT. CROSS SECTION

SPUCE COVERED WOOD FRAME SINGLE PONTOON



Glenn Curtiss (left) with "Triad" at Spanish Bight, 1911.

C. C. Witmer (left), Augustine Parla (hand on plane), and Bob Simon (far right) at the flight school in Miami, Fla., 1912.



Method of crating the Curtiss exhibition pusher for shipment.

McCormick's flying boat as modified at Miami, Fla., in 1914.

of the main float was added. This still was not enough, so a larger planing surface was mounted on bamboo struts five to six feet in front of the main float.

"With this rig, early in January 1911, the machine got up and planed but Curtiss, turning to avoid a mud bank, skidded sidewards and wiped off all the float gear. Repairs soon effected, Curtiss made several flights with this rig. Then one evening he sketched the single pontoon and the Baker Machine Co. built it in three days. It was a complete success; all other pontoons and planing surfaces were eliminated. Speaking of inner tubes—Mr. Curtiss wore several around his body, in lieu of modern 'Mae Wests'!"

Nine days prior to his first successful hydroaeroplane flight, Jan. 26, 1911, Curtiss had opened his flying school for civilians and for the first contingent of Army and Navy fliers. Besides Curtiss, such early airmen as Lincoln Beachey, Eugene Ely, Hugh Robinson, Harry Harkness and Charles Willard gave demonstrations. That same winter of 1911 Curtiss modified the original successful hydroaeroplane, to construct an amphibian called the "Triad." Landing wheels were attached to the single center float. This gear was retracted by hand, employing a rachet and latch mechanism. February, 1911, Curtiss in the Triad, took off from Spanish Bight, flew southward, lowered his wheels and landed near the Coronado Hotel. From there Curtiss again took off, flew northward, raised his wheels and landed in the cove.

DURING this winter, the hydro pioneers were joined by the New York millionaire, Harry Harkness, who brought with him two, perhaps three, beautiful French Antoinette monoplanes. One of them featured a 16-cylinder V type engine, steam-cooled, with fuel injection and an adjustable-pitch, metal propeller. Harkness provided the community with many a thrill. One of his flights in particular had everybody guessing. He was supposed to fly from San Diego to Tijuana, Mexico; drop a sack of mail and return. He made the flight all right but, to this day, no one has ever found the mail!

With spring approaching, Curtiss left North Island and Hallett returned to steady work at the Baker Machine Co. but the foundation for his permanent place in aviation history had been laid.

In April, 1911, Charles C. Witmer, early North Island trained flier, visited the Baker Co. to see Hallett's latest techniques in overhauling and tuning Columbia and Stoddard-Dayton automobiles. Witmer was so impressed that he asked the youthful mechanician to go along as a mechanic on his coming exhibitions. He would receive transportation and $25 a week. Curtiss had loaned Witmer one of his two original North Island land types. This aircraft was double-surfaced, had a short monoplane front elevator and was powered with the engine Glenn had flown to victory in the Bennett Trophy race in France.

The duties of exhibition team members were many and varied and bring to light some of the problems they faced. Witmer handled the bookings and finances. Mechanic Cooper, who was later to become a Curtiss flying instructor, was in charge of the aircraft. Hallett was responsible for the power plant. The mechanics were jointly responsible for disassembly and assembly of the aircraft. Hallett describes the task as follows: "For shipping, we completely dismantled, except that the two panels forming each outer wing section were not separated. All struts were removed and the center section dismantled. We had a wing crate which carried all wing and control surfaces. Another crate was used for miscellaneous parts such as the landing gear, wheels, wires, cables, etc. A third box contained the engine, and a fourth, the tools. It took

two men about two and a half hours to assemble and line up a plane; and a bit less to disassemble and crate it." (See sketches for a detailed breakdown of parts.)

The craft was usually shipped by Wells Fargo Express. Always one and sometimes both mechanics accompanied the boxed aircraft to its next scene of operation. After reaching his destination, the advance man would contact the local sponsor concerning details of the exhibition and financial guarantees. As high as $3,000 a day was paid for a minimum of three flights. Responsibility for looking over the flying field and facilities fell normally on the pilot but one of the mechanics, would check if he reached the location first. In many cases a Fair Ground, or a race track was used. Often balloon exhibitors had preceded their heavier-than-air cousins. This made it necessary for the advance man to scan every foot of the area to make sure no trenches had been left in the ground. These trenches were used for the tubes employed to convey hot air from the heat source to the balloon. Such ditches were narrow and shallow but could wreck you on landings and take-offs.

Convinced that the local field was satisfactory, the advance man would next hunt for a source of high test gasoline; and then visit the local Transfer Co. to procure a Scenery Truck. This was an important piece of equipment, because it was at that time the only vehicle long enough to carry the crated plane from the station to the flying field.

Some teams always rented a tent in which to house their craft but many an Early Bird would have nothing to do with such a shelter. A high wind might collapse the tent on the frail plane with consequent loss of exhibition funds. It was better to stake down the craft and hold it manually during a storm.

Starting the early Curtiss eight-cylinder engine was sometimes a real chore. Hallett recalls: "If the engine was cold, I had someone put his hand over the air intake of the carburetor, like a choke, while I pulled the prop through. If it was very cold, I pumped up a blow torch but did not light it, then used it to squirt atomized gasoline through the exhaust valve of each cylinder. There were no exhaust stacks on this engine, so the valves were accessible to this kind of priming. After the engine was warmed we would adjust the carburetor, as it had no fixed jets. We would then take the rpm with a hand counter at the end of the crank sticking through the propeller hub. In 1911 I used a spring scale to measure standing thrust; 400 pounds was considered good. Gasoline varied so greatly from place to place that it was always necessary to adjust the carburetor."

BUT enough of details. Let's go on with the Exhibitions. The Witmer team, along with their crated aircraft, spent three days and nights riding the rails from San Diego to Wichita, Kan. for their first date. Here they met three other famous Curtiss Exhibition Co. fliers, Jimmie Ward, Saint Henry and Eugene Ely. The next stop was Dallas, Tex., where Cooper and Hallett learned to keep their tools in the shade after burning their hands on wrenches left in the sun. From Dallas they went to Fort Smith, Ark. and here John Cooper left the group for other Curtiss duties. Witmer and Cooper were convinced that Hallett was well grounded on both plane and engine and it was to Witmer's advantage to keep as few persons on the payroll as necessary. He paid the mechanics out of his own percentage. And, although setting up and dismantling the craft was a two-man job, Hallett could always obtain local help.

The crowds were often a great source of danger to the flimsy plane. They would pull on wires and struts if the mechanics were not watching. The latter sometimes attached a spark coil to the plane rigging and the first curious person to touch it was generally the last! Sometimes a member of the ground crew would put on quite an act in an effort to keep back the crowd. Hallett remembers a mechanic named "Blackie," a former circus canvas man, who served him well on one occasion. Hallett, struggling with a crowd bent on plucking his man-made bird, spied Blackie approaching with a big tent stake. Besides being enormous and powerful, Blackie sported a dour look. George yelled: "Don't hit 'em, Blackie, don't hit 'em." The crowd fled. But sometimes, they didn't, as our Early Bird will relate later.

Pioneer Mechanic (CONTINUED)

From Arkansas, Witmer and Hallett journeyed to Evansville and Fort Wayne, Ind. Here passengers were carried in a canvas seat rigged directly behind the pilot. From the Hoosier state, they headed for a North Carolina town and encountered their first hassle. High tension wires, along with heavy crosswind forced cancellation of flying. The spectators did not take this news happily. A milling mob closed in on the flimsy fence around the flying machine which Hallett patrolled. Suddenly a spectator leaped on the plane and shouted: "Let's break it up." Hallett, patience exhausted, clipped him cold and just then the Sheriff arrived. The team was more than glad to forfeit the finances and leave for Raleigh.

Here they encountered a series of forced landings due to engine failures. The keeper of the plane who prided himself on his engine know-how, could not find the cause of them. It was not until later years that he realized how frequently so-called high test gas had actually been casing head gasoline. Being extremely volatile it caused carburetor icing and vapor lock! In those days nothing was known about these conditions. Witmer and Hallett now decided their tired plane needed a major overhaul at the Curtiss plant and shipped it to its birthplace. Some eight days were spent by factory personnel in giving the bird a new center section and engine supports along with minor repairs. When completed, the rejuvenated machine was shipped to Pittsfield, Mass., the next exhibition base.

In those days, due to various urgencies, flight tests of overhauled planes were rarely made at the Curtiss factory. After arriving at Pittsfield, the crated exhibition craft was taken by truck to a pasture where Hallett began to assemble it. He found the new center section had no cutout for the propeller and no bolt holes had been drilled in the wooden laminated engine supports. Believing that the factory knew best, and knowing nothing of balance, Hallett moved the engine slightly aft so that the pusher propeller could clear the wing trailing edge. He tuned the engine and pronounced the combination ready for flight.

Witmer took off for his first exhibition. It soon became apparent that the airplane was tail heavy and at 150 feet it stalled out and went into a spin. Hallett watched his pal smash into the ground. As Witmer lay seriously injured in the wreckage, the crowd turned into a savage mob of souvenir hunters. George and two Wells Fargo agents, using broken wing struts as clubs, fought them off as best they could, and at intervals, threw out a piece of wood or fabric to divert attention. Witmer was taken to the local hospital, fighting for his life. Hallett wired Curtiss for advice and Glenn, accompanied by Lt. Ellyson, came to Pittsfield. Hallett relates: "I asked Mr. Curtiss to explain about the 'Center of Pressure' and whether he could suggest a way to check the balance of a plane before flight? He explained that the center of pressure was approximately one-third of the chord from the leading

edge. The plane could be balanced at this point with the pilot in his seat. Balance could be adjusted by moving the pilot's seat forward or aft a few inches and lengthening or shortening a few wires. This method I used on later occasions."

Pioneer Mechanic (CONTINUED)

With Witmer recovering at Pittsfield, George was requested by Curtiss to report to the factory at Hammondsport, for employment as a mechanic. Hallett recalls Mrs. Mott's boarding house there, where such early birds as Lansing Callan, Elwood Dougherty, Raymond V. Morris, Lawrence Sperry, Morris Tidderington and others would gather under the giant butternut tree, with its seat around the base, and do their hangar flying.

From nearby Lake Keuka our mechanic took his first flight. Both pilot and plane are famous in naval aviation history. The pilot was Lt. T. H. Ellyson, who with Lt. John H. Towers, had been sent for instruction to the Curtiss Flying School. The aircraft was the Curtiss Hydroaeroplane, Navy No. A-1. It was a pusher-biplane, with a single main float and powered by what Hallett believes to have been the *first* Curtiss Model O, eight cylinder, 4 x 5 engine with a single rocker arm, of 70 hp. It was completed early in July, test hopped by Curtiss himself and sold to the Navy for $10,000. On July 12th, 1911, Ellyson took Hallett for a ten-minute ride at an altitude of 30 feet. This was flight number 26 for the historic airplane. Later in the month, Ellyson again took Hallett as observer on flight number 43, which lasted a half hour at an altitude of 300 feet. George estimates that at this time there were six men engaged in engineering, and the combined engine and airframe personnel at Hammondsport numbered around 50.

When an exhibition plane was projected at the Curtiss factory for various pilots—Beck, Beachey, Ellyson, Ward, Robinson, Hamilton, Havens, and Godet—its parts such as wing panels, ailerons, elevators, rudder and controls would be traced in profile on a whitewashed wall, and the flyer's name noted. Time was money in the exhibition business. Frequently the exhibition pilots would send urgent calls to the factory for parts to replace those damaged or destroyed on tour. The original outlines would enable an accurate duplicate part to be made and shipped in minimum time. Then alas, the "Master Spare Parts Pattern Plan" came to an untimely end. A new factory manager was hired over one week end. Apparently, he was a cleanly fellow, because he proceeded to give the "Pattern Wall" a fresh coat of whitewash! There followed many frantic, unhappy days of confusion.

Occasionally mechanician Hallett was sent temporarily to assist some exhibition flier. He recalls one occasion with Cromwell Dixon, youthful lighter-than-air pioneer, who was to lose his life in October of that year at Spokane, Wash. Dixon was showing at Binghamton, N. Y., and had a neophyte mechanic. The field was too small and it would be necessary for both mechanics to stop the aircraft by grabbing the wings when it landed! The new mechanic over-inflated all three tires and they all blew together on the first landing. The receipts were threatened! Hallett sent the lad to town for manila rope and auto tape. The tires were removed and the rims wrapped with rope and tape. Dixon flew his exhibition and collected his fee.

At Chicago, in August, 1911, the elite gathered and Curtiss fliers and aircraft were well represented—Captain Beck, Eugene Ely, "Lin" Beachey, Earl Ovington; Hugh Robinson with his Curtiss hydroaeroplane; Robert Simon and Jimmie Ward, whose engine threw a cylinder almost into the grandstand. By this time, Witmer had recovered and borrowed Robinson's hydroaeroplane to qualify for his Aero Club pilot's license, complying with requirements of the F.A.I. He had not been required to hold one for his exhibition tours.

It was during this meet that Robinson went to the rescue of Bob Simon, when the latter had a forced landing in Lake Michigan—the first such rescue effort of record in aviation history. Robinson, who was performing in his hydroaeroplane at the time, flew out and landed on the water beside his distressed fellow pilot. Boats also reached Simon so Robinson was not essential to the rescue but his action called attention to the search and rescue potential of the airplane.

Most Curtiss pilots had their own mechanics. Lincoln Beachey had Lin Bauter; Bill Hoff took care of Eugene Ely's craft and Hugh Robinson had mechanician W. J. Shackelford. This left Hallett to maintain the planes of Capt. Paul Beck and Earle Ovington. Ovington cracked up and George had to rebuild the damaged bird on the spot. Ovington also had his Bleriot IX at Chicago. A world altitude record of 11,642 feet, was attained by the fabulous Beachey on August 3. An extra five-gallon fuel can was wired to Beachey's center section struts, above and slightly ahead of the Curtiss 8-cylinder, 60 hp engine. A rubber hose between the tanks served as a fuel line. Beachey previously had always used a manual fuel adjustment but for this flight the air valve was removed from the carburetor to give free breathing for better power at altitude. Beachey wore extra B.V.D.'s, his bicycle garters, and had his cap pulled down a little more than usual. At full throttle, he climbed till the engine quit after exhausting its fuel and at sunset came down in tight spirals to a dead-stick landing. Hallett says Beachey contributed largely to modifying the basic control surfaces of early aeroplanes. Curtiss first used a biplane front type elevator and on later models reduced this to a single configuration. Beachey was the first to discard the front elevator entirely, using only the rear one. After that, everyone followed his modification.

After Chicago, Witmer and Hallett started another exhibition tour, their aircraft a new Curtiss pusher with an 8 cylinder, Model 4 x 4, 60 hp engine. It was equipped both with a tricycle landing gear and a single float water gear. Atlantic City, N. J. was successfully covered from the waters of the Atlantic Ocean in late August. From then till December they visited Houghton, Mich.; Sheboygan and DePere, Wis.; Albert Lea, Minn.; and New York City. At DePere, a crosswind made take-off from the narrow river impossible on the scheduled date. Later they returned and Witmer succeeded in getting off the water but crashed when he attempted to land in the stream. He tried to collect his fee and tell the committee why he had not flown the first time, explaining that it was due to weather conditions. One sponsor replied, "There was no weather condition; it was a nice clear day!"

THE flying facility at Albert Lea turned out to be a baseball diamond surrounded by trees. A local townsman stated, "My brother saw 'em at Chicago and they went up just like a bird." Result—no bird-like flight—no fee!

At Sheboygan, using the local fairgrounds, Hallett, who usually was able to obtain volunteers to help him lift the engine (250-300 lbs.), was surprised when, in answer to his requests for aid, no one came forward. Undaunted, George tipped the center section on its trailing edge, rolled the engine up against its mount, bolted it in place and pulled the plane down to its normal position!

On a bitter day in late fall amid snow flurries, Hallett

remembers assembling their craft on a barge in the Hudson River for New York City exhibitions. Barefoot, he guided the float plane from the barge into the icy waters. They had engine troubles. He wired the factory for a new cylinder, fitted it and the piston rings by hand and the engine performed well. George almost froze to death in the process of all this, but mechanics were highly expendable. Now the tour came to an end—winter.

After the holidays, Hallett went to Miami Beach, Fla., where Witmer already was. Curtiss had provided three aircraft; one, a two-place, pusher hydroaeroplane with a single main float, to fly from the waters in front of the Royal Palms Hotel. It was used exclusively for passengers, who paid $10 for ten minutes' flight. The other two aircraft were used at the school, located some distance outside the city limits. Hallett was chief mechanic for this collection of planes, assisted by Tommy Simonds and Bob Faucett from Hammondsport. Also, he was at times in charge of students on the low-powered or "grass cutting" aircraft. Thus he taught flying before he himself was a pilot. Tents on the edge of the field were used for living quarters. Of the eight students Hallett recalls three names: Marti, Parla and Vaughn. Augustin Parla, a Cuban, later became head of his country's Air Force.

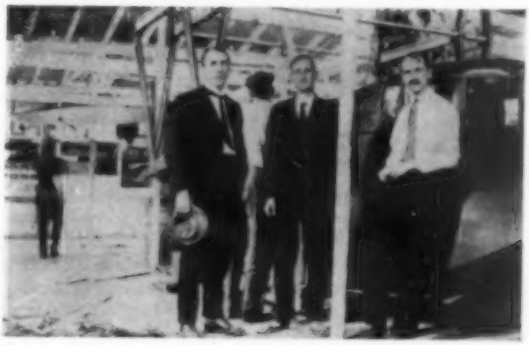
LATE one afternoon Parla was flying some 50 feet off the ground under the watchful eyes of Witmer and Hallett. He was a half mile from their vantage point and cruising steady and level when, suddenly, the plane plunged into the swamp, throwing Parla through the front elevator. Witmer and Hallett leaped on their Curtiss motorcycle and sped to the area. Parla was nowhere to be found, but bystanders said a couple had carried him to a cottage close by. Investigation disclosed Parla reclining in luxury, tended by a kindly couple who were seeing to his every wish for food and drink. The sight of him unharmed and feigning injury was too much for Witmer. He hustled the fledgling from the cottage restraining himself from booting Parla, to make him limp for decency's sake!

Up to this time Hallett had never soloed but he could no longer resist the urge. Early one morning before camp was awake, with Witmer's permission, he started up one of the trainers and after a few runs on the ground, became airborne. His landing unfortunately missed the field and he pancaked on a grapefruit tree! So he had one more repair job on his hands! With Spring approaching, Witmer left for Hammondsport leaving Hallett to disassemble and ship the hydroaeroplane north.

Curtiss aircraft were sold in India, Great Britain, Japan and Russia during 1912. Eugene Godet and Hugh Robinson handled some of the first deliveries in Europe, while Capt. Tom Baldwin handled the business in Asia. Upon reaching Hammondsport, Hallett learned that he and Witmer had been chosen to deliver aircraft to various European countries and to instruct personnel in their use and maintenance. The team left almost immediately for Bremerhaven, Germany. From here they proceeded to Lake Constance, to deliver a "Triad," powered with a Model O, 70 hp engine and equipped with dual controls, to Count Zeppelin. Included in the contract with Zeppelin were flying instructions for his chief engineer, Herr Kober. Kober had had a bit of pilot experience in a German Albatross tractor-biplane, prior to this. After Witmer acquainted him with the Triad he was "ready" to solo. He got off the water satisfactorily but stalled in attempting to turn and washed out the Triad.

Witmer then proceeded to Russia to deliver another Triad and five hydroaeroplanes to the Czar's Black Sea Fleet at Sevastopol. Hallett remained behind to rebuild the ship Kober had wrecked. This took about a week. During his stay at Constance one of Kober's foremen took

Curtiss flying boat (amphibian) at Wismar, Germany, in 1913.



Left to right: Lt. John Cyril Porte, R. N., Hallett and Curtiss with unfinished Curtiss-Wanamaker flying boat, "America," in 1914.

The "America" as she appeared with three OX engines installed.

The forerunner of the Curtiss JN at Hammondsport, in 1914.

George secretly into a forbidden room and showed him a steel tube fuselage with a Maybach engine—a proposed metal airplane they were constructing!

After rebuilding the Triad, Hallett boarded a Russian steamer at Odessa to cross the Black Sea to Sevastopol where he was met by Witmer and the crated birds. Considering their long voyage from America, the planes were in good shape and our mechanic said assembling them was no problem. The Triad and the five hydroaeroplanes were identical in some respects. Each was a two-place, dual-control, pusher-biplane with front elevator mounted on a single main float and powered by a Curtiss Model O. Russian specifications required each plane with two persons and a full tank of fuel to climb 1,000 feet in ten minutes and cruise for one hour. Instruction of Russian personnel was also part of the contract.

Pioneer Mechanic (CONTINUED)

Witmer had no trouble in getting five of the craft, including the Triad, qualified. However, one plane was just plain stubborn. Despite equipping it with the lightest main float, the propeller with the most thrust, increasing the span of its upper wing and the highest revving engine, it failed to qualify. Witmer, accompanied by Russian Lt. Victor Utgoff, missed the altitude requirement by some 50 feet in the time allotted. He climbed out of the machine, slammed down his helmet and said: "You try her, Utgoff." The excited lieutenant, with his roommate, a very slight fellow, rushed back to the plane, forgetting to gas up, and succeeded in reaching the required altitude in less than ten minutes. The Russians were extremely proud of his performance, and Witmer did nothing to spoil the fun.

[Utgoff fled the Russian revolution in 1920 and migrated to the United States where he worked as test pilot for Sikorsky. His son, Lt. Commander Utgoff, USN, was killed in the crash of the first Martin P6M-1 Seamaster, six-jet flying boat, two years ago.—Ed.]

Fate, however, stepped in at this point. Shortly Utgoff cracked up this jinxed plane and poor Hallett had to rebuild it. His assistant was a Russian mechanic, named Smith, short for Kuznetzoff, who spoke English and was a big help at Sevastopol.

Passing years have erased the exact dates and chronological order of the trips made to and from Russia, but our Early Bird mechanic recalls that he travelled to France once, Germany twice and Russia three times. In Russia, Moscow and St. Petersburg (Leningrad) were both scenes of his toil and he was in Sevastopol on three different occasions. In Sevastopol, Witmer first met his wife-to-be. Hallett relates: "When we went to St. Peterburg we again met Witmer's future wife and her equally charming sister who was in training for the Imperial Ballet. We took the two girls to a performance—a wonderful sight in the days of the Czar. On the way home Charles and Ledia, the older sister, got in one vehicle, a horse-drawn cab which would hold only two, and Moora, the younger sister, and I got in another and told the driver to follow Witmer. Well, these two jockeys decided to have a race. Both stood up and lashed their horses clear across St. Petersburg at 1 a.m." Here, too, Hallett first met and talked with the renowned Igor Sikorsky, and Tony Fokker.

The Curtiss team was faced with winterization problems in Russia. They had no heating unit to warm their cold engines prior to starting. Instead, they held a piece of waste soaked in ether under the carburetor intake. While the engine would sound rough—it started! To eliminate ice formation on control cables they used grease mixed with alcohol. Pontoons were used on water, mud and ice. The rough edges of the shore ice would knock off the tin runners on the bottom of the floats. They never did lick this on any of the eight planes delivered to the Russians. At Sevastopol, Hallett witnessed the crash of a French Voisin Canard, which the Russians had modified by adjusting the positive angle of the stabilizer. George had warned them that such a procedure was dangerous; that the plane would not recover from a dive.

Scarlet fever caught up with Hallett on his last trip to Sevastopol and he spent six weeks in a local hospital, where English was unknown. Out of the hospital, he sought and obtained recuperation at the British Consul's house. Meanwhile, Witmer had gone to Wismar, Germany to deliver a plane. When Hallett also left Russia in the Winter of 1913 for Germany, he saw hordes of Russian cavalry moving toward the German border. Upon reaching the German side of the border, he saw large numbers of German cavalry moving toward Russia. "Just army maneuvers," was the stock answer.

In Germany, George got a look at Fokker's "Spider" monoplane. This craft featured all-metal ribs and spars and an all-metal tail surface structure. Struck with the simplicity of construction, Hallett made plans to obtain American manufacturing rights for the plane but by various circumstances was forced to shelve the idea. He recalls Fokker's skill as a designer. One of his monoplanes had been folding its wings in flight. Fokker did not strengthen the wings but actually weakened the rear spar so that it would not be so rigid and would take its proper deflection with the rest of the wing structure!

Like most early aircraft constructors, Curtiss had to be constantly on guard against all kinds of "pitch" men. However, he carried this cautious attitude on money matters over into the ranks of some of his most loyal workers. While overseas, the Witmer team was several times in need of expense money but wires to Curtiss were rarely answered. Once our pilot and mechanic were so desperate that Witmer sent a wire collect, on the hour every hour, until Glenn sent the needed funds.

WE mentioned that Charley Witmer had proceeded to Wismar, Germany. It seems that the team had previously delivered an amphibian differing from the Triad in that the wheels were mounted on a flying boat hull. It was a pusher-biplane with a Curtiss Model O, 70 hp engine. This was the second aircraft of this type that the team had handled overseas. Shortly after it was delivered, trouble developed. The German mechanics had put the "high" instead of the "low" tension wires to the engine switch, which had been placed on the strut running from the engine bearers to the boat hull. In this position it was close to the pilot's head and, in starting, a spark would jump from the strut to the pilot's ear. Hallett returned and wired the switch correctly. The team also delivered a seaplane to the German Baltic Fleet near Danzig, a craft almost identical to those supplied to the Russian Black Sea Fleet.

In the summer of 1913, Witmer and Hallett delivered to the Austrian government a flying boat with the first Curtiss Model OX, 90 hp engine they had seen. Qualification tests took place on the Seine river in Paris. The French had a Doné Levecque flying boat which they were testing at the same time. It was gently lifted and carried by hand for its entrance and exit from the water. The Curtiss boat would demonstrate its ruggedness by charging up from the stream onto the muddy bank where it would come to rest. One day during this period Hallett visited the Buc airport near Versailles and saw an incredible number of Farman and Bleriot aircraft circling about. He watched a hangar empty its brood of Bleriots and it seemed to him that they would never stop coming out. He swears they must (*Continued on page* 60)

A lightplane pilot gets a big charge out of taking over the controls in a light twin.

WHAT!

No thrills left?

By ALBERT W. BAILEY

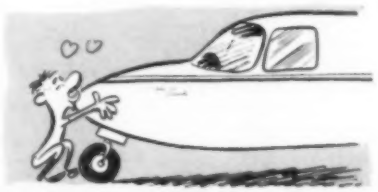
WITH JETS NEARER and nearer Mach 2, one might wonder what's left for the everyday guy who flies a lightplane and cusses the airport which charges him a buck for landing to buy seven gallons of gas.

When we watch contrails at 30,000 feet while we play around with lazy eights at 1,000, it seems sometimes that we are just rolling a hoop. Some of us are beginning to lose some hair, and know we'll never be supermen. It's our lot to go put-putting around in the slow speed lane of the nether altitudes. But don't be too sure there aren't any big moments lying around for us who look askance at IFR, and rarely go far enough from home to file a flight plan.

Russell Conwell, a preacher in Philadelphia, once got up a lecture called "Acres of Diamonds." He delivered it all over the United States until he had raised around a million dollars. Out of it grew Temple University.

Sure, there are acres of diamonds around us all if we but look for them.

Take me, who for long has gazed fondly and enviously at those sleek twin-engined jobs. I've opened the door and looked at the instruments on the panel. I've patted the wings. I've imagined my hands on the throttles. Compared with my old J-3 that plane is the ultimate. What a thrill if sometime someone would ask me aboard his magic carpet.



"Take me, who for long has gazed fondly and enviously at those sleek twin-engined jobs."

Things like that *do* happen. It finally happened to me. One evening the telephone rang. It was Frank Trott of Almont, Mich., calling. Frank is chief pilot for Ligon Brothers, who operate several factories in and around Detroit. They own an Aero Commander and a Navion. I had often walked around that Aero Commander, staring at it just as a kid with a couple of pennies stares at a nickel candy bar.

"How would you like to fly over to Youngstown with me to-morrow?" Frank asked.

It was like asking a hoofer to dance at the White House. Next morning my wife and I were at Almont airport before eight o'clock. Frank was hopping to Youngstown to correct variances on some blueprints. We were also to take over 300 pounds of stampings for a sub-contractor.

Weather was overcast with a ceiling of 1,000 feet, visibility three miles. I was put in the left-hand seat with Frank flying co-pilot. What a thrill right there. And then the business of going up through the overcast, nosing out into the sunshine on top and sailing along above the "white caps." We leveled off and Frank threw up his hands.

"She's yours," he said.

Oh, boy. Keep an eye on the artificial horizon. I learned fast about lag there. Ditto with the rate of climb. Pay more attention to the air speed and ball-bank. Watch that sensitive altimeter.

In the old J-3, all I do in taking off is shove the throttle to the end of the quadrant, ease the stick forward, then back—and up we go. V_1 and V_2 didn't mean anything to me. Whenever I saw such figures in print I thought they were something for engineers to worry about—like pi. In the Aero Commander I found one had to pull the ship up to get off the runway. Not like the old Cub that leaps off the ground if you forget to ease the stick back.

"... so I start a neck-swiveling act."

Our runway wasn't any too long to pick up V_2 speed, but we broke ground at 80 mph. With the Lycomings pulling 26 inches and with half flaps, we were well airborne at the end of the runway and climbing fast with the gear folding into place. Of course, Frank toted me through the take-off.

We're out of the pattern. In the seat behind, Friend Wife is watching with a gleam in her eye. We are going to cross Lake Erie and she isn't sold on the idea. Before we left, I told her we'd probably go around via Toledo so she wouldn't get cold feet. I knew very well we wouldn't. But she didn't say anything when we flew over Lake St. Claire and kept mum as we went out over Erie. She is a good sport.

Frank is sitting back enjoying himself—giving me the impression I'm a real pilot. At last I'm flying an honest-to-goodness airplane, not a glider with an engine out front. But this plane isn't as forgiving as the old Cub, either. I took her up to 3,500 feet, then about a hundred more before I brought her back down to get on the step. I'd learned about that from articles in FLYING. I wanted to show that I knew a little about twin-engined craft. I wanted to make an impression on Frank. But my ego came down a peg when he reached up for the trim control and rolled it forward a bit. Now the ship really is on the step. He juggles the pitch control a little, fiddles with the mixture and adjusts the throttles. Manifold pressure is 22 inches and air speed 151 knots. I thought of getting out my E6B computer to figure out our course and ground speed, but decided it would be better to keep my eyes glued to the gyro compass, air speed and altimeter.

"Take her up another thousand," says Frank as we get out over the lake. I ease back on the controls, add an inch of manifold pressure, and apply a little right rudder at Frank's suggestion. We're out (*Continued on page 80*)

National Distillers pilot, Harold Curtis, in cockpit of company's plane.

Bud Clark, chief pilot for Howard Aero, Inc., builders of Super Venturas.

In converting a surplus bomber to a 300 mph business aircraft, there is always that question—will the user be satisfied?

THE SUPER VENTURA-

SHARP BUSINESS TOOL

By **ALEX DAWYDOFF**, *Associate Editor*

One hundred Peter, Super Ventura owned by National Distillers. Low slung, it permits entry and egress to passengers without use of ramp.

MODIFIED SURPLUS MILITARY AIRCRAFT have contributed largely to the rapid expansion of modern business flying. When in the immediate post-war period, military airplanes were released to the civilian market, those in the transport category were quickly picked up, not only by equipment-depleted airlines and charter operators, but also by business concerns. As most of these aircraft were spartan in their accommodations, and several types had to undergo engineering changes before CAA certification, an entire new industry was created to render them suitable for civil purposes. This "dog tag to glad rag" business, popularly known as "conversion" or "modification," did a remarkable job in plushing-up and making aerodynamic changes in the tired birds, many of which had been bombers.

As business flying increased, requirements for more speed and range grew with it. No longer were all executives satisfied with an aircraft that cruised at 200 mph and had a fuel capacity for 1,000 miles, especially as the airlines were flying equipment in the 300 mph class. Some corporations needed comparable performance, but, there was nothing available, new or converted, that could live up to desired specifications, without going into monstrous sizes. That is until D. U. Howard of San Antonio, Tex., foresaw in the Lockheed PV-1 Ventura, Navy patrol bomber of World War II, the possible answer to an executive's prayer. Through a number of ingenious engineering and aerodynamic changes, Howard Aero, Inc. came up with one of the most sensational business aircraft of today. The Super-Ventura, with its cruising speed of just over 300 mph and a range of 2,200 miles, became immediately popular. Twenty-five of these craft have been sold for a half million each and some purchasers have repeated their orders.

Any airplane which makes such an impact on the conservative and practical U. S. businessman is certainly worth looking into. To do so, I interviewed two veteran pilots thoroughly familiar with every phase of the Super-Ventura—Moring P. "Bud" Clark, chief test pilot of Howard Aero, and Harold Curtis, chief pilot of National Distillers, which company now operates two Supers from Teterboro Airport, N. J.

QUESTION: Bud, suppose you kick off with some background on Howard Aero and the reason for selecting the Ventura?

CLARK: Of course. D. U. Howard, president and founder of the company, started out as an airplane mechanic during the last war. Afterward, he organized a maintenance company, starting in modest fashion on work for local business flyers around San Antonio. Eventually he expanded to general service, leasing a hangar on the airport. Soon he was approached by financial backers to produce a modern, high speed, corporate airplane.

The company set out to research the problem. Basic criteria called for a cruising speed of 300 mph to keep up with modern airlines; a range of at least 2,000 miles; and withal a substantial load capacity in passengers and baggage. Howard investigated the modification potential of every available airplane from the background of this criteria. When they got right down to it, the Ventura was approximately the right size, and known to have great structural integrity and strength. It could carry a substantial payload—had a gross weight of 31,000 pounds. Its control problems could be eliminated by modern engineering.

The Ventura was selected and Howard spent 18 months in engineering, modification and test flying to produce the airplane now known as the Super-Ventura. Flight characteristic requirements, as laid down in CAA manual Part O4B, were used as a guide. The end product more than met them. The airplane is presently certificated on a limited category basis which essentially covers military aircraft not originally designed for airline use, the main restriction being that you cannot fly it for hire. The principal reason it was not certificated under Part O4B was because the ultimate airplane would have been essentially the same, but the cost considerably higher. One of the original ideas in modifying an existing airframe was to keep the cost down.

QUESTION: You are not particularly interested in air carriers? The limited category serves the purpose? An airplane so certificated can be used for business flying, isn't that it?

CLARK: That's exactly right. The design and re-manufacture of this aircraft was aimed specifically at corporate use.

QUESTION: Have you a regular production line set up for the remanufacture of the Ventura at San Antonio?

CLARK: We have. It is set up in seven stages, beginning with complete tear-down. Every electrical and hydraulic unit is removed and replaced by new or rebuilt ones. Rebuilt parts are all engineered to the modern concept. At least 100 modifications are made.

QUESTION: Where do you get the original airplanes?

CLARK: Mostly from Canada. They came to us in excellent shape, with only 300 to 400 hours of total time, completely painted and pickled.

QUESTION: What major modifications, from an aerodynamics and engineering standpoint do you make?

CLARK: A dozen major ones clean up the airplane. For instance the flaps. The original Ventura had a batwing arrangement. In effect, about ten per cent of the flap was trailing all the time. We removed the batwing and cut off the trailing edge of the flap extension, which gives us a straight trailing edge.

This reduced the downtravel of the flap to 60 per cent of the original, and increased the ship's landing speed. To obviate this we modified the flap tracks. Now the flap deflects downward all the way but does not extend back as far. This alteration permits the Super to stall, in full flap configuration, at about 85 mph with power off—real good for a high speed airplane.

Another improvement was redesign of the power package, including installation of a DC-6 type exhaust system. This considerably increased the volume of cool air going to the cylinders. Addition of large propeller spinners helped direct air to portions of the engines where it would do the most good. This modification improved engine cooling so much that cowl flaps can be kept closed even in single engine operation. The power pack modification, which includes zero-time P & W R-2800 late model engines and four-bladed Hamilton Standard propellers, is the greatest achievement as far as cruising speed is concerned.

The windshield was rounded off so that the Super has more visibility than any transport aloft today. Wing and stabilizer tips were squared off, the former primarily to improve the airplane's stall characteristics. Early stall tests showed the Ventura gave very little warning and had a tendency to drop off on either wing. Changing of the tips completely eliminated (*Continued on page* 83)

THE PRO'S NEST

GET THE MOST FROM YOUR FLAPS

Used properly, they will give your aircraft increased performance.

By S. W. HUBBARD, JR., AND TED DUROSKO

FLAPS, ON THE MODERN lightplane, offer the pilot an additional control which, when properly used, increase both safety and performance. By use of flaps the airplane can become airborne sooner; can be more safely slowed down in flight; can make steeper descents without building up airspeed; and can land slower and with a shorter run out. Of course, there is a proper technique in using flaps to gain these advantages; likewise misuse of the flaps can bring about uncomfortable situations. However, if the pilot will think of flaps in the light of their aerodynamic role, he will find it rather easy to use them effectively.

To visualize their part in the aerodynamics of flight, it might be helpful to review briefly their development. In the early days of the airplane, little or no thought was given to slowing it down aloft. It was even difficult to gain speed in excess of that necessary for flight. With advent of the monoplane and the full cantilever wing, aircraft became aerodynamically cleaner. Excess speeds could easily build up in steep glides. Also, with heavier aircraft, experience and practice were required to slow down prior to landing. Air traffic often necessitated a flatter approach.

Slots, spoilers and flaps were developed which, among other advantages, controlled speed in glides. Slots, in general, are automatic leading edge flippers, or stationary openings, which permit more air to pass over the top of the wing, adding lift and permitting slower landing speeds.

Spoilers are small rectangular plates on top surfaces of the wing, parallel to the leading edge at the point of highest lift. When not in use, they lie flat, conforming to the wing contour; raised, they allow a fast rate of descent. Their purpose is just what is implied by the name, to spoil the lift over a portion of the wing and induce extra drag. This increases considerably the "sinking" speed of the airplane but does not reduce its landing speed. Because of this feature, extreme caution must be exercised in their use or the flareout is apt to result in a sizeable drop.

Flaps in general fall into three basic types: hinged, split and high-lift. Examples in this order are: Piper Tri-Pacer, Cessna 195 and Cessna 182. The hinged flap is a hinged section of the trailing edge of the wing that drops down into the slipstream, acting as an air brake and giving some additional lift. The split flap is similar but splits downward leaving the top surface of the trailing edge intact. The high-lift flap slides backward on tracks and hinges downward in one motion thus performing two functions. When fully (*Continued on page* 86)

Right: A Cessna 182 on final approach uses 20 degrees of flap. Above: Full flap is extended for short landing roll. Top: The 182 achieves the shortest takeoff run by use of 20 degrees of flap.

Above: Stits "Skeeto" is a typical example of an ultra-light plane. With a gross weight of 465 pounds, it is powered by a 20-hp converted Evinrude engine. Insert: Advertising for the popular Heath Parasol kits appeared in aviation magazines of the early Thirties.

Considering the high cost of airplane ownership today, for the sheer fun of sport flying . . .

Is an ultra-light the answer?

By DEAN McCARTY

THE TWO-PLACE, 65-hp airplane went down the drain, a casualty of high production costs and limited market. Major producers of light aircraft in the United States today say there is scant chance under present conditions for its revival. They have analyzed the situation carefully.

The ultra-light might be an answer to the increasing cost of aircraft. There are people who feel that sport flying should not be placed beyond the reach of the mass market.

The idea of an ultra-light is not new. Ultra-lights had their greatest popularity during the 1920's and early 30's. Their development was brought into focus in England in '22 when leading manufacturers, as well as amateurs, entered designs for aircraft of extremely low weight and horsepower in the Lympne Light Plane Trials. Most of these aircraft flew very well, despite the fact that they suffered from a lack of suitable power plants.

The enthusiasm spread to other countries. A 1923 Belgian design, the Poncelet Vivette, was powered with a 17-hp engine and could be flown as either a one- or two-place aircraft. An Italian ultra-light, the Pegna Bonmartini Rondini, flew successfully with a $2\frac{3}{4}$-hp engine, as had the English Electric Company's Wren. Dutch designers produced the Pander, an extremely clean open-cockpit monoplane powered with a 25-hp Anzani engine. One of the best of many French designs was the Albert monoplane, carrying a 40-hp Sampson radial. A 32-hp two-cylinder Haacke engine powered the Polish Gabriel which greatly resembled a cut-down Fokker D-8. Ultra-lights produced in England included the Parnell Pixies and Imps, the R.A.E. Hurricane, and the Felixtowe CLA-4. Engines used ranged from 32 to 60 hp.

In the United States a flood of ultra-lights found ready acceptance. Lindbergh's successful crossing of the Atlantic spurred an ever-increasing interest in aviation. Light-weight powerplants were engineered and developed —such as the Szekely, a three-cylinder radial produced in 30- and 45-hp models; the Tiger Kitten, a two-cylinder inverted inline engine, manufac- (*Continued on page 75*)

FRENCH DOUBLE-DECKER

Left: Breguet 763 "Deux Ponts" (two decks) at the New York International Airport after a transatlantic flight from France. Capable of accommodating 107 tourist class passengers, 59 on upper deck and 48 on the lower, it is powered by four Pratt & Whitney R2800 engines rated at 2,400 hp each and has a cruising speed of 230 mph. The lower deck can be quickly converted to carry four tons of cargo. Special ramp, which is hydraulically lowered to the ground, permits easy loading of self-propelled vehicles, such as the French Simca automobile shown in photo below. The plane can also be used exclusively for cargo and in this form has a payload capacity of 25,350 pounds. Air France has 12 Breguet 763's in service which have chalked up an enviable 100 per cent commercial safety record.

HAVE YOU SEEN?

VISCOUNT VC. 10

Above: Clean, unobstructed wings and T-shaped tail with sharply swept horizontal surfaces, are the distinctive features of the Vickers VC.10 jetliner, scheduled to go into operation in 1960. Thirty-five have been ordered by B.O.A.C. for its Transatlantic, Far Eastern and African routes. The airplane will be powered by four, rear-mounted, Rolls-Royce Conway by-pass engines, developing approximately 16,500 pounds of thrust each. The "double bubble" fuselage will be capable of accommodating up to 152 passengers in the upper deck, while the lower one will be devoted to freight.

SEAMASTER Below: Bird's-eye view of the latest Martin P6M-1 Seamaster, four-jet flying boat, undergoing taxiing tests in Chesapeake Bay, Md. Of interest are the canted engine nacelles, on top of wings, angled to deflect the afterburner gases of inboard jets, used during take-off. The 600 mph seaplane has been primarily designed for mine-laying duty but can carry a variety of other military stores, including nuclear weapons. Its range is well over 2,000 miles and it can refuel from submarines. Twenty-four Seamasters are on order by the Navy specially equipped for mine-laying duty.

REHABILITATED BIRD Above: Deteriorating wooden wings grounded many of the Fairchild PT-19's and 23's war time trainers. A way to "Keep 'Em Flying" has been recently devised by crop duster Bill Marlman of Las Animas, Col. who designed and built a metal set of wings for his PT-23. Using the NACA 4415 airfoil and tip plates, the PT-23 turned out to be quite a performer as can be seen from the above photo.

CESSNA 175 Above: Sixth and latest addition to Cessna's line of personal aircraft, the "175" is powered by a flat-six, geared Lycoming GO-300A engine rated at 175 hp at 3,200 engine rpm and 2,400 propeller rpm. Designed to fill the market gap between the 172 and the 182, it sells for around $11,000 FAF factory. The 175 features an entirely new instrument panel with functional grouping of gages and accessories. A distinctive mark of styling is the free-blown, convex canopy, with better rigidity and improved optical quality. Top speed is 147 mph; the range 720 miles.

Whatever became of . . .

THE CURTISS ROBIN?

By LESLEY N. FORDEN

WELL, HERE'S ONE still flying, still cherished by an old timer at Hayward, Calif., airport.

The first three-place OX-5 Robin flew in May, 1928, and the last model was produced early in 1930. In this two-year period, over 700 Robins were built, at that time a production record for one model of civil aircraft. Designed to sell for less than $4,000, the cabin monoplane Robin provided a more comfortable plane than the three-place open cockpit biplanes then in common use.

As of 1955, the CAA listed 49 Robins still in existence, some with the original OX Challenger or Wright engines; others modified for cropdusting with Continental or Lycoming radials.

Old timers remember the Robin as an easy airplane to fly, forgiving, friendly and dependable. Its construction was conventional: a high-wing strut braced monoplane of 41-foot span, 6-foot chord and overall length of 25½ feet. Wing ribs were metal, spars were spruce and the fuselage was of heavy square steel tubing. The empennage was wood and metal and the whole plane was fabric covered.

Early models had high pressure tires, bungee shock absorbers and tail skid. Later models featured balloon tires, oleo struts, tail wheel and brakes. A common color was orange, with black trim, and the Robin was a handsome airplane—no sweeping "jet" lines, but a look of rugged and honest simplicity. Window area was generous and the roomy cabin had two doors with large automobile type handles. The two-place passenger seat behind the pilot could be fitted with stick control for dual instruction.

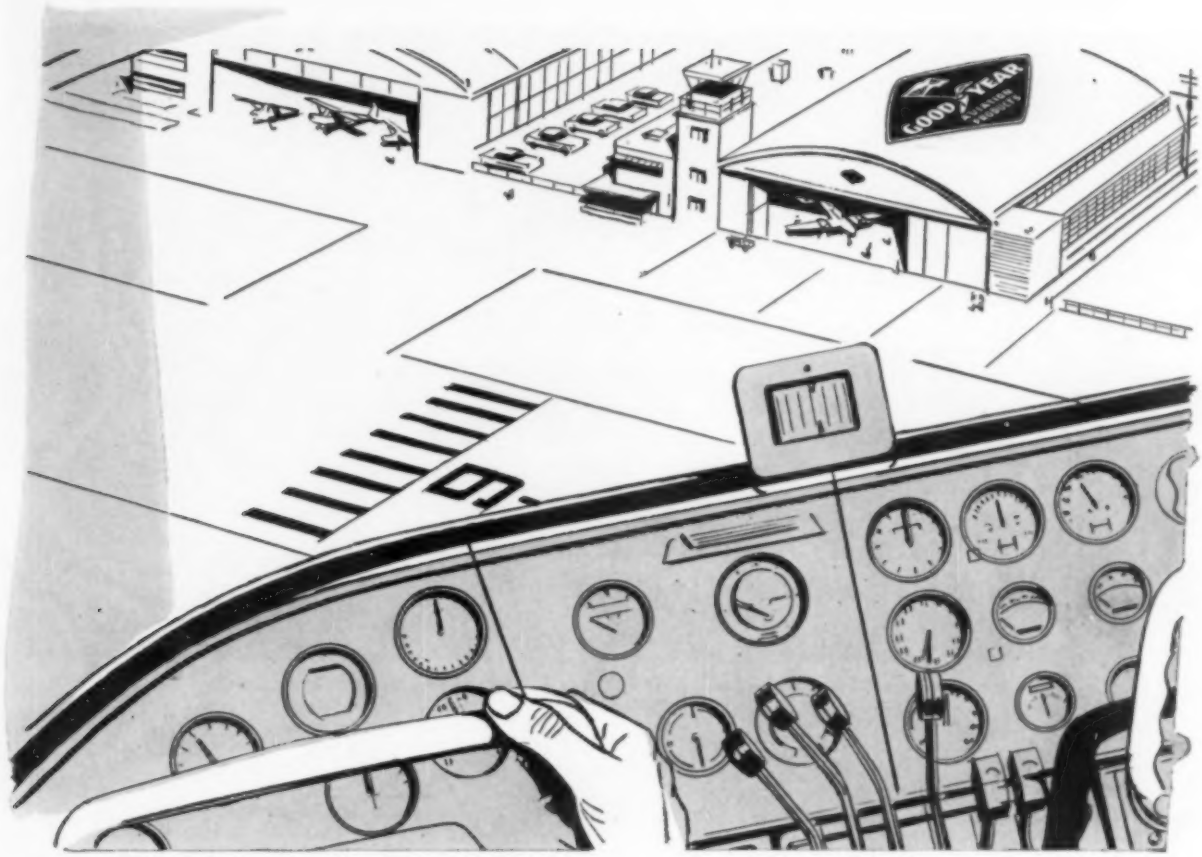
Empty weight of the Robin was 1,489 pounds; gross weight, 2,217. Cruising speed was 83 mph with the 90 hp OX-5 turning an 8½ foot prop with 69 inches pitch at 1,200 rpm. Top speed was quoted as 100 with the OX-5 turning maximum rpm of 1,590—a high rate for the average tired old OX. Maximum fuel provided in two wing tanks was 50 gallons and the normal load of 30 gallons was good for nearly six hours' range in normal cruise.

The radiator for the water-cooled, V-8 OX-5 was mounted in the cowling just ahead of the engine, a departure from the then current biplane practice of slinging it from the center section or underneath the fuselage. Later Robins appeared with the six-cylinder Curtiss Challenger engine of 170 hp. The Challenger resembled a radial, but was technically described as "two threes, back to back." The engine was anything but smooth; old timers recall that sitting behind it was something like driving a ten-ton truck across a series of railroad tracks. Preflight duties always included a careful check for security of cowling, accessories and exhaust stacks, just to be sure the engine would not hammer them loose in flight. Another optional engine was the Wright J6-5, a five-cylinder radial of 165 hp. The added power greatly improved the Robin's performance and many OX-5 owners converted their ships to the bigger engines.

In 1930 the four-place Robin was announced, complete with wider fuselage, cabin refinements and the new "smoother" 185 hp Challenger. Price was listed as $7,995, a lot of money in 1930, and may have had something to do with the fact that very few four-place models were built before production ceased entirely.

The Curtiss Robertson plant at St. Louis was headed by aviation pioneer Maj. William B. Robertson, one of Lindbergh's original backers. Production manager was the late Ralph Damon, president of Trans World Airlines. The Curtiss Wright sales organization consisted of 25 "flying fields" from coast to coast, one of the first serious attempts at a national sales and service organization for various makes of airplanes.

The Robin was famous for dependability. The first "record" was made in January, 1929, when factory pilot Dale Jackson stayed aloft three hours in an OX Robin to perform 417 consecutive slow rolls. In May, 1929, Laurie Yonge of Jacksonville, Fla., established a solo non-refueling endurance record of (*Continued on page* 84)



Green light for dependable service

The "green light"—your landing clearance—is always a welcome sign.

And there's another welcome sign here, too—the Goodyear "Sign of Service."

For at home or away, you have learned from experience that the man who displays this sign is dedicated to serving well your aviation needs—large or small—private or commercial.

It means that here you will find the highest quality aviation products – not only tires, tubes, wheels and brakes—but also a wide variety of other original equipment parts and accessories for the nation's vast fleet of private, business and executive aircraft.

It means that here you will find, at reasonable cost, prompt, efficient and courteous service backed by a time-proved reputation.

Wherever you fly, look for this sign—the Goodyear "Sign of Service"—your "green light" for dependable service.

GOODYEAR
AVIATION
PRODUCTS

Goodyear Aviation Products Distributors

AIR ASSOCIATES, INC. *Atlanta, Ga.—Chicago, Ill. Dallas, Tex.—Glendale, Cal.—Miami, Fla.—Teterboro, N. J.*

AIR-PARTS INTERNATIONAL *Burbank, Cal.—New York, N. Y.*

THE DON HORN COMPANY *Municipal Airport, Memphis, Tenn.*

GENERAL AIRCRAFT SUPPLY CORPORATION *City Airport, Detroit 13, Michigan*

GENERAL AVIATION SUPPLY COMPANY *St. Louis, Mo. Houston, Tex.—Oklahoma City, Okla.—Dallas, Tex.—Phoenix, Ariz.*

STANDARD AIRCRAFT EQUIPMENT COMPANY, INC. *P.O. Box 271, Mineola, Long Island, N. Y.*

STANDARD PRODUCTS, INC. *Wichita, Kans.—Tulsa, Okla.—Kansas City, Kans.*

VAN DUSEN AIRCRAFT SUPPLIES *Minneapolis, Minn. East Boston, Mass.—Miami, Fla.—Teterboro, N. J. Chicago, Ill.—Richmond, Va.—Alexandria, Va.*

PIEDMONT AVIATION, INC. *Winston-Salem, N. C.—Norfolk, Va.*

DENVER AIRPLANE SUPPLY *Stapleton Airfield, Denver, Colo.*

AVIATION SUPPLY CORPORATION OF FLORIDA *Tampa Fla.—Orlando, Fla.*

The author flying a T-33 when he was on active duty in the Air Force as a maintenance test pilot in the Training Command.

NO. 218

I LEARNED ABOUT FLYING FROM THAT?

A brand new "firecan" jockey loses control in a formation flight.

By R. J. HOLLAND

SINCE DISCHARGE from the Air Force, I have been doing all my flying in sailplanes in the French Alps and not worrying about fuel consumption and cross-country planning. However, I have memories.

On my last cross-country in the Air Force, I was completing the return leg of a navigational training flight from California to Alabama, in a T-33. Since I had done plenty of cross-country in jets, I was to show the pilot in the back seat how much I knew about this process. Unfortunately, I did just that.

The flight to California had been uneventful. The plane had been operating normally, although it was something of a "dog." A check of weather in San Bernardino, however, promised a good trip all the way, with a 70-knot tail wind at 35,000.

I had a little difficulty with the interphone cutting out occasionally, but made a normal landing at Denver and, while refueling, had the radio and interphone inspected. All worked perfectly on the ground.

Weather east showed diminishing winds at altitude and a few large cumulus build-ups. The distance to Alabama was long for one hop with the winds reported, so I filed direct to Greenville, Miss. at 1,000 on top with the idea to check my fuel there and proceed to Alabama if all was favorable. The leg was uneventful and, although I had difficulty with the radio and interphone, a little persistence enabled me to communicate.

Over Greenville at 37,000, I found that tail winds had been stronger than forecast. I wasn't exactly over-loaded at this point but had plenty to make Alabama if I could change my flight plan to VFR to comply with AF fuel reserve regulations. At this point in my career I was still unduly influenced by advice I had received in Korea concerning fuel reserves, i.e. "You don't carry that stuff around for ballast. Use it." I cancelled my IFR to Greenville and extended VFR to Alabama.

A few minutes later, I noticed solid undercast had formed. A garbled weather report came over the low frequency radio. My destination was overcast. I tried to transmit on the UHF radio. No response. I tried the interphone. Completely dead. I attempted to tune the radio compass to the nearest station. The needle began to revolve in useless circles. It was impossible to identify any station whatsoever, eliminating the possibility of using the loop or range positions. Suddenly, the navigation lights went out along with most of the cockpit lights. The circuit breakers would not stay in.

I had no choice but to hold my heading and fly time and distance. I started to check the slave gyro with the standby compass but this was an early model airplane and the standby compass was in an obscure corner of the cockpit—unreadable without a (*Continued on page* 90)

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA

New Chevron aviation credit card

Now a new Chevron Aviation Credit Card is available for use by private and business flyers at more than 300 Standard Airport Dealers throughout the West and in Alaska. In this vast area, Standard has more aviation dealers at your service than all other companies combined. In addition, the new card will be welcome at many other aviation dealers in the rest of the United States and Canada. And, the card is good for automotive products as well.

So, if you're like the many other flyers who have discovered through experience that regular service with Chevron and RPM Aviation Products gives planes more pep and power, you'll want this new credit card. It's flight-weight in a handy size to fit your wallet. You can apply for it simply by mailing the coupon below. And for safer, more enjoyable flying, for business or pleasure, make it S.O.P. to use Chevron and RPM Aviation Products every time.

TM.'S "CHEVRON," "RPM," "PLANE FAX," CHEVRON DESIGN, REG. U.S. PAT. OFF.

-AVIATION CREDIT CARD COUPON-

MAIL TO: Standard Oil Company of California, Room 1610, 225 Bush Street, San Francisco 20, California.

☐ Please send application blank for new aviation credit card.

☐ I have Standard Oil Company of California automotive credit card number_____. Please send me an aviation credit card.

NAME_____ ADDRESS_____

CITY_____ ZONE____ STATE_____

Announcing a 175-h.p. Cessna! Fast

New Cessna 175—with big-airplane stability, big-airplane comfort, big-airplane speeds up to 147 mph . . . but priced at only $10,995

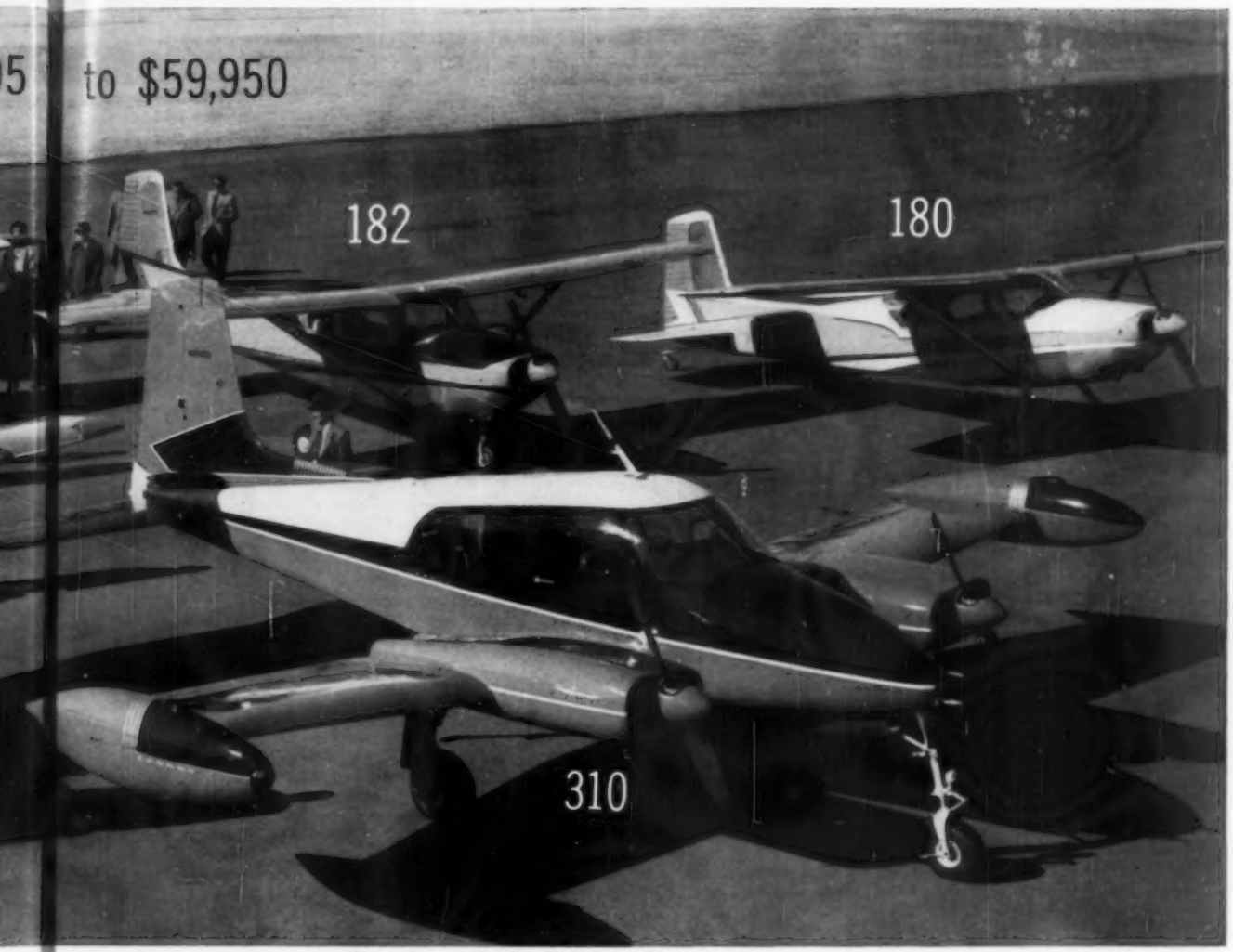
This 175-h.p. Cessna is "Power-Geared" by a smooth, quiet 6-cylinder Continental engine—the *only* airplane with so much power at such a low price: $10,995 with std. equip., f.a.f. Wichita. But "Power-Geared" performance isn't all the new 175 offers. Look!

New full-view windshield for finest forward visibility . . . new kind of easy-to-work, easy-to-read instrument panel... approved for floats . . . wide-span spring-steel Land-O-Matic landing gear for easy *drive-up* take-offs and *drive-in* landings . . . huge Para-Lift flaps . . . ultramodern 4-place interior . . . all-metal construction.

See the big, beautiful Cessna 175 *now!* Call your Cessna dealer (Yellow Pages of phone book). Or write CESSNA AIRCRAFT COMPANY, Dept. F-23, Wichita, Kansas.

CESSNA 310B—new twin-engine airplane owned and flown by hundreds of businessmen. Winner of U.S.A.F. light-twin competition. Now known as the world's best all-around light twin. Quiet, spacious cabin with executive accommodations for five. Cruising speed: 213 m.p.h. $59,950 with std. equip., f.a.f. Wichita.

6 GREAT CESSNAS 172 175 180 182 **SKYLANE** 310 **THE**



Your Cessna Dealer Will Start Showing the Cessna 175 and the Cessna Line on March 22nd

new addition to the Cessna fleet!

CESSNA SKYLANE—de luxe airplane completely equipped with radio and navigational gear with inherent advantages of "package pricing" and factory installation. More speed, more stability, better climb, less maintenance, and 50 more h.p. than competitive airplanes in its class. $16,850 fully equipped, f.a.f. Wichita.

CESSNA 182—with sparkling beauty, performance. Most stable and lowest cost of any airplane in its class. New comfort-engineered 4-place cabin. All-metal construction. Cessna's exclusive Land-O-Matic landing gear and Para-Lift flaps. Highly dependable 230-h.p. Continental engine. $14,350 with std. equip., f.a.f. Wichita.

CESSNA 180—famous wherever there are challenging flying problems. Conventional landing gear of spring steel for smoothest, safest ride on rough fields. Easily adaptable into amphibian or ski-plane. Ideal for "bush" flying. 160-m.p.h. cruising speed. 230 h.p.; 4-place, all-metal construction. $13,850 with std. equip., f.a.f. Wichita.

CESSNA 172—roomiest 4-place cabin, highest stability, only full-size and all-metal airplane in its class! $8,995 with std. equip., f.a.f. Wichita.

Cessna **Inquire about Cessna lease plans**

COMPLETE AIR FLEET FOR EVERY BUSINESS NEED

Pioneer Mechanic

(Continued from page 46)

have been hanging up by their tails in the hangar! In Paris, Curtiss and the fabulous Early Bird "Doc" Wildman (who died almost unknown and forgotten in August 1956, at the El Roy Hotel in San Diego) met the team. Unknown to Witmer and Hallett, Glenn had already received an order from Rodman Wanamaker to construct a flying boat to be known as the "America," for a proposed transatlantic crossing. Curtiss meanwhile had hired his first bonafide aircraft designer, B. D. Thomas. It is interesting to note that while Thomas designed the America, he was hired for the sole purpose of designing the Curtiss Model "J" Tractor!

In July, 1913, Hallett and Witmer returned to America. Home was a welcome sight. While they had been abroad, Curtiss had sold a flying boat to Harold F. McCormick of International Harvester. McCormick had visited Hammondsport, taken a ride in a flying boat with Glenn and later purchased one to fly back and forth between his country estate at Lake Forest, Ill. and his office in Chicago. Because of McCormick's efforts such men as George U. Von Utassy, G. M. Hecksher, William Scripps, J. B. R. VerPlank, Jack Vilas and William Thaw purchased Curtiss boats. During this period 20 of them were constructed at Hammondsport —all for private use. Upon arriving at Hammondsport, Hallett began work on the boat McCormick had purchased. It was originally a tractor-biplane powered with an OX 90 hp engine. However, before delivery to McCormick, it was converted to a pusher-biplane type with a hull similar to the Model F, but with room for four seats. With modifications completed, the McCormick boat, accompanied by Hallett and Witmer, was shipped to Chicago, where George assembled it. The team flew and serviced it until early autumn.

Hallett recalls that at the time Chance Vought, eminent American designer, was publishing an aviation periodical, "Aero and Hydro" in Chicago. He and George often would meet for dinner after the day's work. If Vought had sold any subscriptions he would treat George to a 35-cent meal. If not, Hallett would do the honors!

At the close of the summer season McCormick told Witmer and Hallett to take his plane South and make expenses. It was a kind thing to do. During the Winter and Spring of 1914, the McCormick boat was based at the beach in front of the Royal Palms Hotel at Miami Beach. Hallett told me: "Our sign said: '10 miles—10 minutes—$10.' We learned to keep things 'hot.' I would have Kapok jackets on the next pair of passengers waiting to step in as the last pair stepped out. We installed a large gas tank so we did not have to stop to refuel while the crowd was around. But good maintenance was impossible since corrosion proof materials were not yet available. Most metal parts had to be replaced at the end of the season. I was able to maintain the hull and the engine okay."

In the spring of 1914 the team, with their tired craft returned to the main Curtiss base. In the interim B. D. Thomas had arrived in Hammondsport with the basic design for the Curtiss J Tractor-Biplane. This aircraft was constructed and flown as a single-float seaplane, according to Thomas, "hatched" as a water bird because the field at Hammondsport was too small. The characteristic overhang of the top wing was added because of increase in weight brought about by the floats. But even before the Model J was test-hopped, Thomas was designing the America!

Hallett completely rebuilt McCormick's Flying Boat in preparation for the coming summer, and the OX engine made its initial test run without any adjustments, to the surprise of the factory men. Hallett is convinced that this fact got him assigned to the America project. Witmer and his brother-in-law Ben Thomas, operated the McCormick Boat that summer in Chicago.

Rodman Wanamaker of department store fame, foresaw transatlantic flight. The original plans called for a long range tractor-biplane, land type aircraft. It was to be powered with a Curtiss engine of new design, an eight-cylinder, 5 x 7 of 180 hp, which eventually became the Curtiss R, but now had broken up on its initial test run. Atlantic flight plans called for a crew of two men—Lt. Porte of the British Navy (Ret.), assisted by Lt. John H. Towers of the U. S. Navy. Secretary of the Navy, Josephus Daniels, however, wanted an American as chief pilot, so Lieutenant Towers was withdrawn from the project. Hallett recalls; "I heard Mr. Curtiss say that Towers would not be allowed to go so I said to him: 'What you need is a good engine mechanic who can fly enough to take a "trick" at the controls.' Curtiss then confided to him that the America would be a twin-engined Flying Boat, powered by two Curtiss OX engines. Hallett was to be in charge of final assembly and maintenance of the engines during their 50 hour test run.

Soon thereafter Curtiss asked George if he could fly and was referred to Witmer, who had returned to Hammondsport for a few days from Chicago. Witmer said, "Sure, he can fly!", whereupon Curtiss chose Hallett to take Lieutenant Tower's place. Never one to let such an opportunity pass, George suggested that he should have a chance to practice a bit and Curtiss gave him 2½ hours in the old Red Flying Boat, an ageless craft, under the guidance of "Doc" Wildman. Hallett remembers his first flight with Doc. Wildman told him to take off and fly down the lake at 200 feet. The wind was blowing off the hills in heavy gusts and Hallett was real busy at the controls.

When he landed about 10 miles down the lake, Doc said: "It's quite rough isn't it?"

Hallett emphatically agreed. Doc said: "Now on the way back you do thus and so and it won't be nearly so rough"—and it wasn't. Lack of flying experience on Hallett's part proved in one respect to be an asset when it came to flight testing the America. The controls of this boat differed in that the ailerons were operated by foot bar rather than by the shoulder yokes familiar to Curtiss pilots of that period. Since George had done little piloting, he had formed no definite control habits, and found it easy to adapt to the new control system of the big boat.

The America was constructed in a little over two months. Its development is a good example of the problems faced by the pioneers. When the aircraft was built it was supposed to lift 2,200 pounds, the estimated total weight of fuel, oil, and crew required for the transatlantic flight, but it wouldn't fly. The basic problems were hull displacement and planing surfaces. Thirty-two modifications of the hull were made, including such ideas as a sea sled bottom and a submerged hydrofoil; also a tri-motor version of the aircraft.

Hallett and Curtiss had fun with the press, while developing the Atlantic flyer. Many Eastern papers sent reporters to cover the test flights of the boat. Curtiss, on one occasion took aboard an astronomical number of sand bags with the reporters watching on the dock. While they were counting the bags and figuring the tremendous load, Curtiss taxied out and, when far from shore, slipped many bags into the water before taking off.

A memorable moment in Hallett's life occurred one afternoon when the America in his hands succeeded in flying on one engine. Curtiss was elated and excited by the performance. He said it was his first ride as a passenger!

Spark plugs of those days were not reliable by modern standards. Experts were skeptical of their ability to stand up for the duration of the proposed transatlantic flight, so Hallett developed and put into practice a method of changing them in flight! First he fashioned deep

(Continued on page 62)

NEXT MONTH IN FLYING

AVIATION begins and ends on the ground. As is the airport—so is the commerce and defense and utility and pleasure of aviation.

Next month's issue emphasizes the place and progress of the airport and its facilities—something of history, something of requirements, something of big airports and small ones. You'll find the issue a wealth of information. Will catapults come into routine civil use? Will jet blast destroy runways? How about "the word" from a veteran airport manager? Can mixed traffic be safely handled at the average airport? Remember the barnstormer's pasture? Where do pilots go for the biggest fish-fry fly-in?

The issue also marks return of the very popular "Airman's World" series as a frequent feature.

There's an important future ahead

for the men who wear these wings

The Air Force pilot or navigator is a man of many talents. He is, first of all, a master of the air—and no finer exists. In addition, he has a firm background in engineering, electronics, astronavigation and allied fields. Then, too, he must show outstanding qualities of initiative, leadership and self-reliance. In short, he is a man well prepared to cope with any problem, to meet any situation.

If you believe you can measure up to these high standards, a great future awaits you. Find out today whether you can qualify for the Air Force Aviation Cadet Program. It is your chance for invaluable training—and the stepping-stone to an exciting career.

U.S. AIR FORCE AVIATION CADET PROGRAM

GRADUATE THEN FLY

MAIL THIS COUPON TODAY

Aviation Cadet Information, Dept. F-132
Box 7608, Washington 4, D. C.

Please send me details on my opportunities as an Aviation Cadet in the U.S. Air Force. I am single, between the ages of 19 and 26½, and a resident of the U.S. or possessions. I am interested in ☐ Pilot ☐ Navigator training.

Name_____

Street_____

City_____ Zone____ State_____

Passengers and Crew Agree! Puritan Oxygen Masks Are COMFORTABLE TO WEAR EASY TO ADJUST

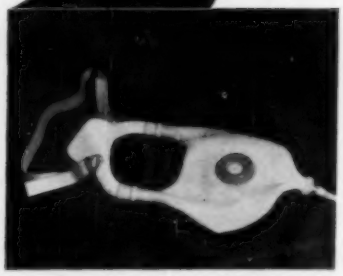
DISPOSABLE, PLASTIC PASSENGER MASKS

THEY ARE LOW-COST, TOO!

PILOT AND CREW MASKS

Passengers have a right to expect comfort and pleasing appearance in an oxygen mask. The Puritan disposable mask—originally developed to meet rigid hospital requirements—has many advantages to offer. The polyethylene nose piece fits the face comfortably and is easily adjusted to each individual. These complete, light-weight masks come individually packed and can be thrown away after use (no bothersome sterilizing). The Puritan disposable mask answers your passenger desire for comfort and convenience . . . answers your problem of a low cost unit.

Priced at only $1.00 each F.O.B. Kansas City (lower unit cost in larger quantity) No. 114011.



Ask any pilot or crew member what he wants in an oxygen mask. Chances are he'll say, "comfort, coolness and easy breathing." Here is the mask that gives all of these advantages. The Puritan No. 114000 nasal oxygen mask. A constant flow, rebreathing type mask with a comfortable fitting plastic nose piece and latex rubber bag. The nose piece is arranged to provide a perfect air flow in and out of the bag so that respiratory effort is minimized and mask is cooled for further comfort.

Carbon dioxide build-up is controlled.

No microphonic connections needed.

Priced at only $8.25 ea. F.O.B. Kansas City

Aviation Division

PURITAN MAID

Puritan

SINCE 1913

COMPRESSED GAS CORPORATION

2012 GRAND AVE. KANSAS CITY 8, MO.

PIONEER MANUFACTURER OF AVIATION OXYGEN BREATHING EQUIPMENT

SKYCRAFT DESIGN

Metal conversions. Lifetime aluminum. Not a kit.

Custom-quality, ST/CAA-approved. Economy prices. Hundreds of satisfied customers. Call Langhorne, Pa., Windsor 5-7750.

(Continued from page 60)

pockets in his coveralls so that the danger of tools or plugs falling out was greatly reduced. To secure himself in flight, he employed a telephone lineman's belt, hooked to a strut, after climbing from the hull to the wing. From this perch he could force a clamp device under the engine's exhaust rocker arm to relieve compression. Next a special tight-fitting socket wrench was placed over the spark plug which securely held it while being unscrewed and transferred to Hallett's deep pocket. The replacement plug was then jammed into the wrench inside George's pocket; and removed and installed on the engine! Ingenious people, these Early Birds! Standing out on the wing, Hallett recalls being fascinated by the sound effect when first one engine and then other would appear not to be running as his position between them varied or as their speed changed.

Then in August, 1914, World War I broke out. The Wanamaker project was shelved and the airplane eventually shipped to England to take part in coastal patrol work.

During the same period that the "America" development was in progress, Curtiss was rebuilding and modifying Professor Langley's unsuccessful "Aerodrome." This machine, as received at Hammondsport, was in its wrecked condition. Hallett remembers that the beautiful original hollow wing ribs were replaced with solid ones and innumerable structural changes effected because of the addition of twin floats. The plane was always flown over water because no one would risk it over land. Its engine interested George. The old surface carburetor was removed and replaced by a "Schebler" which reduced the "breathing" of the plant. This cut the rpm from approximately 900 to 850. When Charles Manley, the inventor of this original engine heard the modified version run he said it didn't sound right. It should sound like a Gatling gun! For the record, Glenn Curtiss flew this greatly modified craft on May 28, 1914 from the waters of Lake Keuka.

With the America flight cancelled, George wanted to visit his home. He asked Curtiss to finance the trip so that he could work at North Island. Glenn said no, so Hallett made the trip on his own funds and reported to North Island late in 1914. His first project was to assemble the Curtiss Army Competition aircraft. This plane was called Model N but was *actually the original Curtiss Model J*, modified at Hammondsport, and shipped to North Island. The N featured larger top and bottom wings than the J, with an eight degree dihedral. It was powered with a Curtiss OXX engine, rated at 100 hp, which had about ¼ inch larger bore than the Model OX, and had a second spark plug in each cylinder. According to Thomas, the N was later modified to the "JN" (Jenny) for the British Army!

As Hallett remembers, there were five two-place aircraft in the North Island Army Trials. One was a Wright twin-pusher-biplane, known as the "Tin Cow,"

(Continued on page 64)

HOW ABOUT

BETTER TOWER IDENTIFICATION?

The little guy in a little airplane with just a tunable VHF receiver would sure find life a lot simpler if tower operators would give out with a little more frequent identification. It would help the controllers, too, in their work.

At many metropolitan areas there are several towers operating on adjacent frequencies. For instance, in New York you have Newark on 118.3, Westchester on 118.5, LaGuardia on 118.7, Idlewild on 119.1, Teterboro on 119.5. It's very easy to tune to what you think is Westchester only to find, sometimes embarrassingly late, that you're tuned to LaGuardia. All this would be prevented if the various towers would slip in a word giving identification a little more frequently.

What the boys in the greenhouse forget is that not every airplane is equipped with crystal-controlled or crystal-calibrated tuning. With just a tunable receiver you have to rock your needle around until you stumble onto the tower or ask for a short count.

"Whistle-stop" tuning, which was first introduced on the Narco Simplexer transceiver, is now standard on the Narco Omnigator Mk II and the VTA-3, 27-channel transmitter attachment. All you do to tune a tower is set your transmitter to the tower frequency, turn the "whistle-stop" function switch on, tune your receiver until you hear a high-pitched hum. That means you're tuned precisely to your transmitter frequency. Then turn off the "whistle-stop" and know you're tuned to the tower.

Another point on tower technique is to tune the tower 15 or 20 miles out. Don't wait until you're practically over the field before going through that procedure. By tuning in early, you get a pretty fair picture of what landing conditions are, what other traffic is around. And the tower boys can do a better job if you give them a call 10 minutes out.

See you next month.

Nancy

NARCO • Fort Washington, Pa.

P.S. A salute to Vero Beach (Fla.) radio. Jammed with VFR flight plans as they are, they still sign off with a very amiable "Have a pleasant trip."

(Advertisement)

Need more frequencies?

. . . FOR BETTER TOWER, EN ROUTE AND DIRECT CENTER COMMUNICATIONS

Add the narco SIMPLEXER 27 CHANNEL VHF TRANSCEIVER

The Narco 27-channel Simplexer is business aviation's most popular communications transceiver. With its broad-band transmitter (118 to 126.7 mc) the Simplexer accommodates 27 crystals covering every channel needed for normal IFR operations. "Whistle-stop" feature gives quick, crystal-calibrated tuning for simplex transmission with center, tower or ATCS. Compact size permits convenient installation. Thousands of Simplexers are in daily use. Just the answer for that extra communications unit you need while working VOR or ILS.

AND NOW! *narco* VTA-3 27 CHANNEL TRANSMITTER WITH "WHISTLE-STOP" TUNING FEATURE

Now, multiply transmitting channel capacity with little weight penalty and lowest cost with the new Narco VTA-3, 27-channel VHF transmitter. VTA-3 can be used with own power supply as independent unit or in conjunction with Narco Omnigator or Simplexer. Available in low-band version (118 to 123 mc) or high-band version (121.5 to 126.7 mc).

"Whistle-stop" feature provides positive, crystal-calibrated tuning of any VHF receiver in the airplane.

You'll enjoy the convenience of the extra 27 channels provided by either the Simplexer or VTA-3. Bring your communications up to date with one or both of these fine Narco units. See your Narco dealer or write for brochure.

narco

NATIONAL AERONAUTICAL CORP., FORT WASHINGTON, PENNSYLVANIA

NORTHROP
A & E GRADUATES
(Aircraft & Engine Mechanics)
GET THE BEST JOBS FASTER!

American Airlines Photo

Yes — because Northrop Institute was founded by Aircraft Industry Leaders—and because the training is intensely PRACTICAL—the entire Industry accepts Northrop Graduates as "outstanding." The demand for Northrop A & E grads has often been greater than the supply.

50-WEEK COURSE

No time is lost on non-essentials — that's the reason why so much is taught in just one short year. Yet the training is complete, so that Northrop A & E grads readily obtain their A & E CERTIFICATE, issued by the Civil Aeronautics Administration. They readily qualify for excellent jobs with companies located in all parts of the world.

RECORD OF SUCCESS

Just ask about Northrop Institute training at any leading Airline Service Depot, Aircraft Plant or Aircraft Maintenance Facility. The outstanding record of Northrop graduates is the very best testimony to the quality of Northrop Institute training.

ADVANCED JET COURSE

Increasing demand for Jet Engine Maintenance Technicians is now assured, due to the large number of jet airliners which will soon be in scheduled airline service. Be prepared for this demand!

EMPLOYMENT ASSISTANCE DURING SCHOOL AND AFTER GRADUATION

Northrop Institute offers a permanent free placement service to all graduates. This department also makes every effort to assist students in finding part-time employment if they request help.

CHOOSE THE HOURS WHICH ARE MOST CONVENIENT FOR YOU TO ATTEND SCHOOL
SHIFT ONE—7:45 a.m. to 3:15 p.m.
SHIFT TWO—4:30 p.m. to 12:00 p.m.

Approved for Veterans

Northrop
Aeronautical Institute
An Accredited Technical Institute
1119 W. Arbor Vitae Street
Inglewood 1, California

Mail Coupon for Free Catalog

NORTHROP AERONAUTICAL INSTITUTE
1119 W. Arbor Vitae Street, Inglewood 1, Calif.
Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:

- ☐ Master Aircraft and Engine Mechanic
- ☐ Jet Engine Overhaul and Maintenance
- ☐ Aeronautical Engineering Technology
- ☐ Electronic Engineering Technology
- ☐ Aircraft Maintenance Engineering Technology

Name ..... Age ...
Address .....
City ..... Zone ... State .....
Veterans: Check here ☐ for Special Veteran Training information.

(Continued from page 62)

which still used the wing warping principle rather than ailerons. The interesting feature of the craft to George was the Austro-Daimler engine, a remarkably economical type in regard to oil and fuel. No splash oil system was involved; instead it employed a mechanical multiple plunger engine-driven injection system. The cylinders were of steel with electrically deposited copper jackets, and its performance was outstanding. Installed in a Curtiss N several years later it flew many hours trouble free.

Glenn L. Martin sent a tractor-biplane powered with a 125 hp Hall-Scott Model "A" engine. This aircraft, flown by Martin with Lt. L. E. "Ned" Goodier as a passenger, crashed and both men were severely injured.

Another competition plane was a Burgess-Dunne pusher-biplane, flying-wing type. Its engine was of French origin, a Salmson, radial, and water-cooled. A name plate attached to the unit stated: "System Canton-Une." There was no master rod, but the master bearing of the shaft was held in position by gears!

The remaining aircraft for the contest was a Schmidt tractor-biplane powered by a twin row Gnome, rotary, and air-cooled.

Hallett believes only one of each of the competing aircraft was constructed.

Main requirements of the Army Competition called for the aircraft to have a four-hour flight duration and a climb of 1,000 feet in ten minutes with full load. The Curtiss N failed to meet these requirements and Glenn was very upset by its poor performance, especially that of the Model OXX engine. Hallett told him he was sure he could get the plane to pass the tests and Curtiss replied that if he could, there would be a good bonus for him.

Hallett recalls: "I had to reduce oil and gas consumption and improve the climb. Oil consumption was high because there was a slight pressure in the crank case. We connected the primary air intake of the carburetor to the crank-case breather and put a second breather on the other end of the crank-case. Thus the engine drew part of its air through the crank-case and reduced the pressure there. The warm air through the carburetor allowed me to lean down the mixture and thus burn less gas. I also installed a larger diameter propeller with lower pitch. This improved the climb. Additionally, I persuaded pilot Ray Morris to take advantage of the updraft on the windward side of Point Loma in the early part of his climb."

Now the N passed the trials. Hallett had to remind Curtiss later of his bonus promise and finally got it, but only after working hard for it in more ways than one.

During the competition, the Curtiss organization had designed another primary trainer of tractor-biplane configuration. Plans for this plane were drawn by a San Diego lad, whose name Hallett cannot recall. The machine was powered with a rare six-cylinder Curtiss OX engine, one of only two in existence at that time. George remembers that this engine had a bad intake manifold and that he helped to rework it. Curtiss rigged the controls for the first test flight of this trainer and took George along for the hop. Just after take-off, the wing hit the ground and the plane cracked up. After they crawled out of the wreckage, Glenn said, "Don't tell anyone, George, but I rigged the controls backward." Hallett was profoundly grateful that he had not rigged them!

During the fall of 1914, an early Curtiss Model "F" flying boat arrived at North Island from Hammondsport, Hallett and the cheerful Bert Acosta assembled it for flight. Curtiss flew it and was satisfied with its performance. This plane was scheduled for delivery to the North Island Army training camp, located about a half

(Continued on page 66)

From Ewing Galloway, N. Y.

WHERE AM I?

Airmen in Europe may feast their eyes on some of the world's loveliest scenes, such as this famous castle which has been a royal residence since the Eleventh century.

(Answer on page 82)

Weatherama Model 6X39. Two separate antennas. Broadcast Band and Weather Band. 7 transistors plus 2 diodes. In chrome and black finish. Prices and specifications subject to change without notice.

Now–get weather reports every 30 minutes, 24 hours a day with a portable radio . . . costs only $79.95

New Motorola® Weatherama

Dual-band, all-transistor set receives both long-wave Aeronautical Marine Beacon Band and AM Broadcast Band

What a time saver! Now you can receive continuous weather reports and flying conditions or airports within a 500-mile radius, wherever you go. Switch on Weatherama . . . Motorola's rugged, "pocket-size," all-transistor portable radio. Weatherama is completely self-powered . . . goes where you go. Gives you last-minute government weather reports over the long-wave Aeronautical Marine Beacon Band (200 to 420 kc). It also operates on standard AM Broadcast Band. Four small, inexpensive pen-light batteries power Weatherama continuously for up to 150 hours.

Stop in and see it in action. Your own personal weatherman . . . Motorola's new Weatherama . . . at a low, low price of $79.95. Earphone, carrying case and window mounting bracket optional, extra.

MOTOROLA

World's Largest Exclusive Electronics Manufacturer.

DEPENDABILITY and ECONOMY

PYE

Low power AM mobile radiophone

..."reporter"

Ideal for use in: Airfield crash trucks, tow-tractors, gas trucks, police cars, executive cars and airline service vehicles.

Effective communication at maximum economy. Highly efficient noise limiting, nearly *MAINTENANCE-FREE* operation, easy alignment, minimum battery drain—no alternator or H.D. generator necessary— has transmitter "filament off" switch. Mounts easily under dash board without special tools.

Frequency Range: PTC 117 covers 118-132 and 144-174 mcs.
Input Voltages: 6 or 12. Also 24 VDC or 117 VAC optional extra.
Transmitter Power Output: 1 to 1½ watts over frequency ranges.

A few exclusive territories for experienced mobile radio communication distributors still open.

Literature on Request

PRICE: $280.00 complete F.O.B. Warehouse

PYE CORPORATION OF AMERICA
Telecommunications Division
1149 Raritan Avenue, Highland Park, N. J.

AIR-O-EAR HOME VHF RECEIVER

Hear planes in flight, control towers, weather and emergency broadcasts. Plugs into any wall socket. 200 mile reception with built-in antenna. Sold throughout the world direct from manufacturer.

AIR-O-EAR MODEL 710 WN $79.95

AIR-O-EAR IS USED BY . . . AMERICAN AIRLINES, NORTHEAST AIRLINES, TRANSOCEAN AIRLINES, STANDARD OIL COMPANY, BELL AIRCRAFT, ALAMO AIRWAYS, CHAMPION SPARK PLUG CO., NORTHERN CONSOLIDATED AIRLINES, U. S. PLYWOOD CORP., FLYING TIGER AIRLINES.

Now Order from this Convenient Coupon

NOVA-TECH, INC.
1721 Sepulveda Blvd., Manhattan Beach, Calif.

Gentlemen: Please ship your new AIR-O-EAR VHF Receiver with 10-day return privilege.

☐ I enclose 79.95 ☐ Please send C.O.D.

NAME.....

ADDRESS.....

CITY.....STATE.....

IN NEW YORK

Touch Down

AT

ZAHNS AIRPORT

AMITYVILLE, LONG ISLAND

Serving Greater New York

Hard surface runways 4200 ▪ Unicom Teletype ▪ Direct line to ATC and INSAC ▪ Instrument approach ADF ▪ Runway lighted all night ▪ Rotating beacon ▪ Motel

Air Taxi • Charter flights
Hertz rental cars

Gov't. approved Airplane and Helicopter flying school

Sales • Service • Storage

Tel.: Amityville 4-4200

(Continued from page 64)

a mile from the Curtiss school and on the east side of the Island. For some unknown reason, Curtiss wanted Acosta and Hallett to push the boat in the water by hand to the Army camp! There were sting rays in the muddy bottom and the boys said nothing doing. Curtiss then flew it to the Army camp himself. It was employed for dual instruction by Doc Wildman, for a number of years. It had yoke type aileron controls which could be adjusted. George adjusted the wires so that Wildman, without touching the controls, could take off, fly and land in still air conditions!

Oscar Brindley, a former automobile racing driver, and Roy Francis, early California pioneer who exhibited with E. E. B. Frank Bryant, were two other civilian instructors employed by Army along with Doc.

Hallett recalls that Doc was raised in Hammondsport and believes the late E. E. B. worked on Curtiss motorcycles and on the earliest Curtiss planes, such as the "June Bug." Doc was the mechanic for Canadian Early Bird, J. A. D. McCurdy, when he attempted, on January 30, 1911, to fly non-stop from Key West, Fla. to Havana, Cuba, only to experience a forced landing at sea ten miles short of his goal. Truly, Doc Wildman grew up with aviation—it would take volumes to record his career.

In December, 1914, after completion of the North Island Army Competition in which Curtiss, Martin and Wright were awarded orders, George went to work for the Army as a mechanic at $1800 per year. He left Curtiss because the pay was better and more consistent. However, there never were hard feeling between Glenn and George. Actually, Curtiss urged the Army to hire him. The shrewd inventor wanted someone in the air service who was familiar with Curtiss engines!

Hallett says: "North Island, at that time, was Army's principal aviation center. Aside from the Competition planes, they had five or six Burgess-Wrights with Renault, air-cooled "V" type engines; one Curtiss flying boat, two or three Martins and a couple of Curtiss JN's. None of the aircraft had engines of over 90 hp and none could fly over 70 mph. The first "Jennies," later used as trainers in World War I, when regarded as very slow "crates," were originally considered so fast that only the two best pilots at North Island were allowed to fly them!"

Hallett's army duties were many and varied. He was a trouble shooter and consultant on engine matters. At first, the Army mechanics were skeptical of him but he soon proved that he knew engines of all types.

He recalls that one of the troubles of the Curtiss OX engines was weakening of the exhaust valve springs. These springs were located on the unjacketed portion of the exhaust outlet and lost their temper. The result was that when the engine was idling, one or more of these valves would open and flood the cylinder with air, so that they would not fire. George found he could put his

(Continued on page 68)

New JET Engine Mechanic Course Offered by Spartan...

Two months of intensive, specialized training at Spartan will qualify you for advancement to Jet Engine Mechanic—on the airlines' mighty, new jet transports!

At Spartan, you'll disassemble, inspect, repair, and assemble axial flow jet engines and accessories. You'll re-install them in the airframe and stand by for ground check and further repair work—when necessary—just like fulltime jet engine mechanics do every day. And, of course, all of this actual experience is backed up by plenty of formal classroom instruction.

An extra two months of training—at Spartan—is so little additional time to invest in your jet-age future—with a guarantee of bigger dividends! Fill out coupon and mail it today for full particulars.

MAIL TODAY

Spartan is approved for training under G. I. BILL OF RIGHTS

MAXWELL W. BALFOUR, Director SPARTAN SCHOOL of AERONAUTICS
Dept. F-48 Municipal Airport Tulsa, Oklahoma
Please send complete information immediately.

Name_____ Age____

Address_____

City_____ State_____

Indicate which of these branches interests you:

- ☐ Jet Engine Mechanic
- ☐ Aircraft and Engine Mechanics
- ☐ Instrument Technician (Standard and Electrical)
- ☐ Flight Engineer
- ☐ Link Trainer Instructor
- ☐ Vet
- ☐ Non-Vet

SPARTAN
SCHOOL OF AERONAUTICS
MUNICIPAL AIRPORT / TULSA, OKLAHOMA

THIS SPRING
our
SKY-TRAC
ANOTHER STAR PERFORMER

This versatile Champion will fill the bill for any use, including Aerial Patrol and agricultural. It will feature:

- 140 H.P. ENGINE
- UNRESTRICTED VISIBILITY
- EXTERNAL SPRAY TANK
- PAYLOAD
- UTILITY
- LOW PRICE

WATCH FOR
our
DX'ER
TRANSPORTATION DELUXE

In the tradition of Champion we have done it again. Here's an airplane plush and well appointed to please the most discriminating taste of Mr. Businessman, Mr. Salesman and everyone.

- 140 H.P. ENGINE
- SPEED
- COMFORT
- EASE OF HANDLING
- LOW PRICE

CURRENT
'58 MODELS
TRAVELER
and TRI-TRAVELER

These tried and true members of the Champion family are well received the world over. Exceedingly beautiful with color matched interiors and exteriors.

- 95 H.P. ENGINE
- 26 GALLON FUEL TANKS
- COMFORT
- ROOM
- UTILITY

Champion Aircraft Corporation
Osceola, Wisconsin **Dept. 1 f**

Please send more information about Champion.

☐ Traveler ☐ DX'ER
☐ Tri-Traveler ☐ Spray Units
☐ Sky-Trac ☐ Demonstration

Name:_____ Age:_____

Address:_____ Phone:_____

City:_____ State:_____

OVERNIGHT STOP—NO. 36

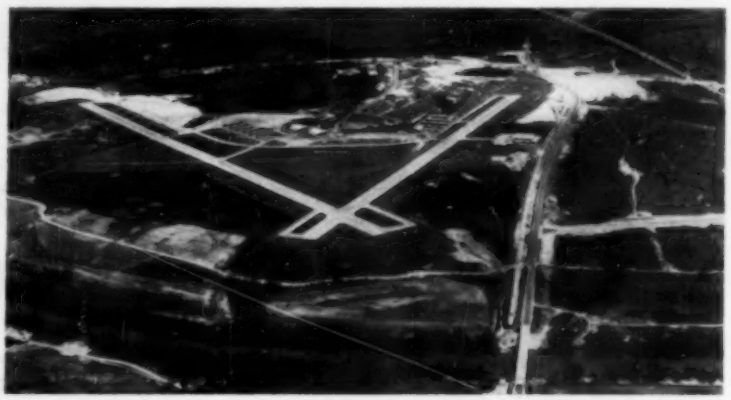
LELAND MOTEL

Atlanta, Ga.

IF YOU ARE FLYING in the Atlanta area you may wish to set a heading for the Fulton County Airport, a public use field (Birmingham chart) 8.3 miles west of Atlanta and just southeast of the Chattahoochie River.

About halfway into town, the Leland Motel on U. S. 78 offers air-conditioned attractive accommodations at rates $6 up and $7 up for single and double rooms. AAA-recommended, the Leland provides the niceties of free transportation to and from the field in a 1957 Cadillac, a playground for children, bassinet for the infant guest, rollaway beds and free TV. (Two excellent eating places are near by.) As a member of ATA, the Leland also accepts all major oil company credit cards.

The airport has paved runways, the longest, East 4,400 feet; a modern administration building with a lounge and restaurant. It is equipped with beacon, runway lights and control tower; storage, major and minor repair facilities and 80/91/100 oct. fuel. It is airmarked and no landing fee is charged.



(Continued from page 66)

finger on the exhaust valve springs, feel the vibration and find which spring was weak. This "magic" used to mystify the Army mechanics. After a year of duty at North Island, his commanding officer, Captain Cowan, requested him to give engine lectures. Up to this time George had never heard a lecture, let alone give one! However, he complied and besides developing a successful system of investigation into causes of engine failure, wrote a thorough and detailed manual entitled, "Airplane Motors; a course of practical instruction in their care and overhaul," which was published in 1917 for the Army.

The Army school for mechanics grew during 1916 and, by the middle of the year, Hallett had a class of 150 men, half of whom were flying officers and the other half, enlisted mechanics. George remembers that Sgts. Wilber Hammond, C. J. Moors and Walter Folke, along with one civilian instructor, John O'Mally, assisted him. All students, including the flying officers, had to pass George's examinations on theory and to successfully assemble, disassemble, test run and time an engine. In the latter part of 1917, Hallett was ordered to Washington, D. C. and put in charge of organizing a system of mechanic's schools for the Army. How he accomplished this; his orders to Wilbur Wright Field; the organization of the Engineering Division at McCook Field; his associations with such Army figures as Colonel Bane, Gen. "Billy" Mitchell, Major "Shorty" Schroeder and a host of other famous ones is another story. The barnstorming mechanic had come far and would go on to become a great test pilot.

He built foundations whose value modern aviation has no way to evaluate. Nor is such evaluation necessary. It does seem but simple justice, however, to mark that George Hallett and that handful of whom he was typical were as truly national trail blazers as were those who pioneered the colonies and opened up the West. END

OFF TO A GREAT START!

Join with many other young men who want their active part in this air age . . . and who want to enjoy both study and play in Miami's perfect year-round climate.

A LIFETIME CAREER IN AVIATION and a pleasant day of boating have much in common. To do either, you've got to know where you're going, chart your course and get "off to a great start."

But an outboard motor is nothing compared to the complicated maintenance and repair of modern multi-engine aircraft . . . or the developments in jet and rocket propulsion. It takes *specialized* training to work on powerplants, wings, fuselages, landing gears, control systems, propellers, carburetors, fuel systems, and rigging. That's where Embry-Riddle enters the picture.

A graduate of the E-R *Airframe and Powerplant Technician* course has acquired all the knowledge and specialized skills necessary to completely disassemble, repair, and re-assemble an airplane. He has become a professional technician.

In addition, Embry-Riddle offers many other courses tailored to your specific aviation interest. Whatever your course, you will receive individualized education under personal supervision of a faculty of specialists.

FOUNDED 1926

Embry Riddle

AERONAUTICAL INSTITUTE

MAIL THIS COUPON TODAY

for pictorial brochure and full information.

DIRECTOR OF ADMISSIONS,
Embry-Riddle Aeronautical Institute
111 Aviation Building
Miami 52, Florida

I want to be in the lead of the air frontier. Send me background material on world-famous E-R training.

Print Name _____

Address _____

City _____ State _____

Age _____ ☐ Vet ☐ Non-Vet

- ☐ AIRFRAME & POWERPLANT TECHNICIAN
- ☐ AERONAUTICAL ENGINEERING TECHNOLOGY
- ☐ BUSINESS PILOT
- ☐ COMMERCIAL PILOT
- ☐ A & P COMBINED WITH COMMERCIAL PILOT
- ☐ INSTRUMENT RATING

Latest EXAM HANDBOOKS

"NEW OPEN BOOK EXAMS"

"These exam handbooks are GUARANTEED to conform with the actual CAA exams more than any other booklet sold in the U. S. A."

MAIL THIS COUPON TODAY

Any 3 $9.00
Any 2 $8.00
Any 1 $5.00

- ☐ Private Pilot.....$5.00
- ☐ Commercial Pilot.....$5.00
- ☐ Instrument Pilot.....$5.00
- ☐ Airline Transport Pilot.$5.00
- ☐ Flight Instructors....$5.00
- ☐ Aircraft Mechanic....$5.00
- ☐ Engine Mechanic.....$5.00

☐ Payment Enclosed ☐ Ship C.O.D.

NAME.....

STREET.....

CITY.....STATE.....

— SPECIAL —

I would like to have a complete set of your EXAM HANDBOOKS.

Please RUSH me the entire set for **$20.00**

☐ CHECK HERE FOR THIS SPECIAL OFFER.

AERO PUBLISHING OFFICE

MEACHAM FIELD TERMINAL Dept.F-11 FORT WORTH, TEXAS

GENUINE NAVY INTERMEDIATE PILOT JACKET

Brand new Genuine dark brown Goatskin leather with zippered front. Bi-swing back, two patch pockets, one inside snap pocket. Mouton fur collar, Celanese lined, 100% wool cuffs and waistband. The finest jacket made.

SIZES
34 to 46
$32.50
48 and 50
$35.00
State Size Wanted

U. S. N. ISSUE

A2 ARMY FLIGHT JACKET, select dark brown goatskin leather, brown rayon lined, zippered, elastic knit waistband and cuffs, 36 to 46, **$19.75,** 48 and 50, **$21.75.**

U. S. AIR FORCE K2A FLYING SUITS, blue nylon, lightweight, 8 zippers, give chest, height and weight measurements. **$10.95.**

Miracle Suede Jacket, washable, drycleanable and stain resistant. Knit nylon collar and cuffs, nylon lining. Colors available in rust, tan, and charcoal, sizes 36 to 46. **$16.95.**

Shipped ppd. If remittance accompanies order.

Distributors of tires, batteries, aircraft parts and equipment

FLYING EQUIPMENT SALES CO.
Dept. F-16
1639-45 W. Wolfram St. Chicago 13, Ill.

GLASCO-AIR
fiber glass conversions
pat. pend.

caa approved under class "c"—no underneath fabric tests required

Increases strength • Decreases fire hazard • Eliminates fabric maintenance and recover problems • Lowers noise level and helps stabilize cabin temperatures • Increases resale values and performance • Highly resistant to hail, prop ice, and other in flight and on-the-ground weather hazards • Unaffected by harsh dusts and sprays, gasoline, oil, etc. • Will not dent yet harder to damage than most metals • Easy and inexpensive to repair • Will not deteriorate, will not rust or corrode • Extra Light Weight (adds only 15-30 lbs. to light aircraft) • Retards airframe corrosion • Competitive.

contact GLASCO-AIR
West 5th St. Airport
Oxnard, California
HUnter 3-4004
for full details

ATT: AIRPORT OPERATORS
DEALERSHIPS AVAILABLE
Write Today for Full Details

11 Days Over the North Atlantic

(Continued from page 30)

As the bucket is pulled from the water, he tries to regain speed to prevent the airship being pulled down. I have never started this operation without a tinge of uneasiness. Our first bag of water was picked up without incident. As we started the second run, however, we ran into a rain shower. As the airship slowed, rainwater clung to the huge envelope. This added weight caused the airship to start settling. At the same instant, the winch operator started reeling in and the bagful of water acted like a big anchor. We started down at an uncomfortable rate of speed. By using full take-off power on both engines and the judicious handling of the winch by the operator, Ed Moore, we were able to stay in the air. It was an exciting experience which probably set a record water pickup 1,600 miles from land.

We had asked the Super-Connie to proceed from Bermuda to Puerto Rico and rendezvous with us enroute. Now the big airplane circled us and chatted on the radio. Our navigation put us seven miles from where they reckoned we were. Naturally, we accused them of being wrong, but were happy to be so accurate after three days without sight of land.

After dinner I asked Dehn to report to the cockpit for a checkout on the controls. He had never operated them, so the fundamentals were explained and he was set to practice. Locklear went to work on the cake while we kept Dehn engrossed. After three hours, Dehn was called aft where the crew had gathered to sing, "Happy Birthday." Cake and ice cream were served in the decorated radar room. It was a great party. Dehn told me later it was his first.

NINTH DAY

The crew was a little on edge as we relieved the watch at midnight to begin the ninth day. We were within eight hours of equaling the world record for unrefueled flight. The message from the base was more exciting than usual. Details of the flight would be released when we had been airborne 200 hours. Would we consider landing at Miami, Fla.? We began to figure distance to Miami, secretly hoping to fly all the way back to our starting point.

It was still dark as we threaded the Virgin Islands, slightly nerve-wracking flying below the peaks, but radar was an advantage and we kept close watch on the scope until dawn. The passing of the 200-hour mark went unnoticed. As we approached Puerto Rico, a small Army airplane circled us and at noon our Connie again appeared en route to Miami to arrange for our landing at the Marine Corps Air Station, Opa Locka. Just then we were passing the 6,880 mile mark previously set by the Graf Zeppelin. We chatted briefly over the radio.

That night came a message that Opa Locka was out. Would we consider Key West? We checked weather up the coast. Two storm centers lay on the track to South Weymouth. Landing would be in

(Continued on page 72)

NEWS BULLETIN FOR MANUFACTURERS:

Grows Hair on Billiard Ball – No Sale!

HISTORIC RESTORER LACKS DISTRIBUTION

A Hair Restorer, so potent it grows crew-cuts on billiard balls, is not being sold because its maker has no field distribution, it was learned today.

Thus, Manufacturer Bertram B. B. Botts, Esq., is in the frustrating position of enjoying few, if any, sales with a product potentially worth billions. Incidentally, he also is up to his neck in Hair Restorer and crew-cut billiard balls.

Mr. Aviation Manufacturer, if you have a fine product but poor distribution, there may be a moral here for YOU. In the Jet Age, your problems will multiply as never before. Users of jet equipment will require you — perhaps by contract — to guarantee never-failing parts support in the field.

Southwest Airmotive can't handle Hair Restorer, but in the distribution of aircraft and engine units and components, we have one of flying's most capable and experienced teams. We are boosting sales and improving relationships between manufacturers and their airline and private aviation customers throughout Midwestern and Southwestern USA.

To the 25 leading manufacturers whom we now represent, we have brought around-the-clock, personal field contact and liaison; longer production lead-time; advertising, and effective on-the-spot inventory and salesmanship.

To the customer, we have brought convenience; a vital "second source"; shorter lead-time, and savings in inventory, freight, and obsolescence, to name but a few of the benefits.

Should you not be satisfied with your own distribution, contact: Marketing Manager, Southwest Airmotive Distribution Division, Love Field, Dallas, Texas.

Southwest Airmotive Co.

LOVE FIELD, DALLAS
DISTRIBUTION DIVISIONS: KANSAS CITY • DENVER

1932 — A QUARTER CENTURY OF LEADERSHIP — 1958

(Continued from page 70)

fog and rain. In any case we were happy for the opportunity to cruise the Florida coast to add hours to our record flight time. We replied, "We are making plans to land at Naval Air Station, Key West. Estimated landing time is end of the eleventh day."

TENTH DAY

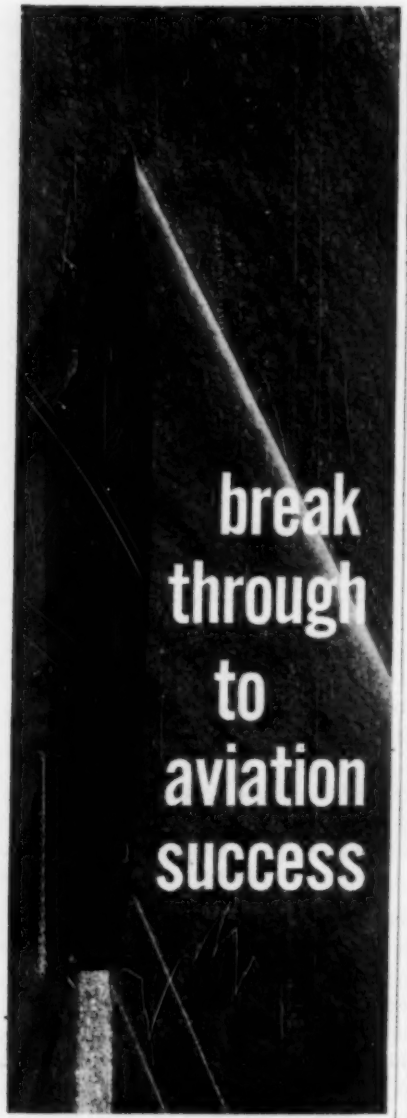
The tenth day started with a real thrill. We received a message from Adm. Arleigh Burke, Chief of Naval Operations. "HEARTIEST CONGRATULATIONS ON ESTABLISHING A NEW WORLD ENDURANCE RECORD FOR AIRSHIPS X YOUR UNTIRING EFFORTS AND DEVOTION ARE MOST COMMENDABLE X THIS FLIGHT DEMONSTRATES AN INCREASED ASW AND AEW CAPABILITY AND OTHER ACHIEVEMENTS WHICH SERVE TO DEMONSTRATE A CONTINUING SEARCH FOR TECHNOLOGICAL ADVANCES BY THE U S NAVY X WELL DONE X ARLEIGH BURKE"

Every member of the crew was as proud as punch. He could have waited until the flight was completed but chose to go out on a limb. We wanted him to know how we appreciated it. Dehn, calling to mind the Admiral's nickname, "31 Knot Burke," asked what our average groundspeed had been. It figured out at almost 31 knots. So, our message read, "THE CREW OF THE SNOWBIRD SINCERELY APPRECIATE YOUR MESSAGE X OUR AVERAGE GROUNDSPEED THIS FLIGHT 31 KNOTS REPEAT 31 KNOTS"

At daybreak, we passed over Andros Island and three hours later made landfall at Miami Beach. We flew over Miami, then north in contact with the control tower at Opa Locka. They asked us to cross their field for pictures of the *Snowbird* and a radio press interview, and then to rendezvous with a Goodyear Blimp over Miami Beach. We met the blimp and flew along side-by-side while movies were taken. The voice from the Goodyear Blimp sounded familiar and turned out to be that of one of my first airship instructors, Capt. Verne Smith, one of the greatest of airship pilots. He told me Donna, my wife, had arrived in Miami and was boarding an airliner for Key West. Now we left Miami and headed for Dry Tortugas. Just before midnight, we came upon literally hundreds of shrimp boats. The ocean looked like a city. Missing only were the neon lights.

ELEVENTH DAY

We welcomed in the eleventh day over the Dry Tortugas and set a course for Havana, Cuba, intending thence to approach Key West and circle until ready to land. It was daylight when we raised the Florida Coast. We decided to land at the 264-hour mark. We could stay aloft several hours longer, but were told dignitaries from Washington would be present and some firm landing time must be



Get started "on course" and *fast!* Choose your aviation direction, study in Air-Minded Miami, and you're on your way. There's excitement, high pay, and a limitless future waiting for you. Act now.

Embry Riddle
AERONAUTICAL INSTITUTE

122 Aviation Building • Miami 52, Florida
Attn: Director of Admissions

I want to be in the lead of the air frontier. Send me background material on world-famous E-R Aviation Training.

Name .....
Address .....
City ..... State .....
Age ..... ☐ Vet ☐ Non-vet

I want to make my future in:

☐ Flight
☐ Aeronautical Engineering Technology
☐ Airframe and Powerplant Technician

MAIL THIS COUPON TODAY!

GANGWAY!

YOUR EYES DECEIVE YOU. No accident is imminent here, nor is this picture an accident. It is purely a spring-fever idea cooked up by Pete Bowers, Boeing flight test engineer and frequent contributor to FLYING Magazine, who hobbies in old aircraft.

None other than Pete is at the controls of the Curtiss pusher plane of 1912 vintage nearing its top speed of 60 mph when the Boeing 707 came "poking" by at a sedate 180 mph—practically stalling speed for the sleek 600-mph jet transport soon to take the regular airlanes.

By pre-arrangement, Bowers took off with a photographer-loaded car easing along below him and, as the 707 came into sight for a low pass over Boeing Field and eased alongside the old pusher, the camera shutters recorded 46 years of aviation development in a matter of seconds.

the right formula...the right airplane for modern transportation

1 h.p. = 1 m.p.h. + (economy + speed)

the Mooney MARK 20

The new and improved 1958 Mark 20 with its advanced design and laminar flow wing is the world's most efficient airplane. It's a dream come true — for each engine h.p. you travel one m.p.h. or more, in safety and comfort!

- Mark 20A with 180 h.p. Lycoming engine — cruise at 180 m.p.h.
- Mark 20 with 150 h.p. Lycoming engine — cruise at 165 m.p.h.

Prove to yourself why the Mark 20 is the **right** airplane for modern day, fast, inexpensive transportation. Compare **all** the Mark 20's quality-plus features. See and fly the Mark 20 today. Caution: Be prepared to want one!

For information and name of your distributor write:

Mooney Aircraft, Inc. • *Kerrville, Texas*

What's with Propellers?

McCauley's out front!

...Lighter! Faster! Smoother!

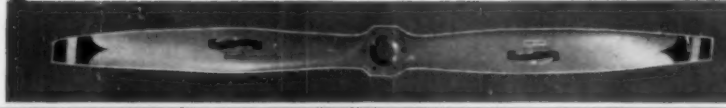
What do today's pilots expect from propellers?

New McCauleys — both fixed-pitch and constant-speed—are delivering *more* of what they want in 1958.

Here's the new Cessna 175 with a McCauley Met-L-Prop on its nose. McCauley Met-L-Prop was specified because it's *lighter*, produces *smoother* engine action and *faster* take off, climb and cruise. You can forget propeller worries —for the life of your plane—when you fly McCauley . . . The industry's largest manufacturer of metal propellers for personal and business aircraft. Available throughout the world.

Specify McCauley!

McCAULEY Industrial Corporation • 1840 Howell Ave. • Dayton 17, Ohio, AMherst 3-3541



FIELDING AVIATION CORRESPONDENCE SCHOOL

P.O. Box 3132 M.S.S. Tallahassee, Fla.

"Knowledge is Power"

Complete Home Study Courses Now Available

Don't cram for an Exam. The knowledge necessary to pass CAA Exams—And more important—The knowledge necessary for safe and proficient inflight and ground operations requires systematic, supervised, constantly revised and thorough training. This training is now as near as your mail box for all CAA Ratings. All of these courses are prepared and presented by CAA Licensed instructors who are currently employed as Academic and Pilot Instructors at USAF Primary Pilot Contract Schools and Army Aviation Centers. These courses cover all phases of each subject, step-by-step, and all students receive personal attention and counseling. These courses are excellent for CAA Exam preparation, refresher training for Licensed Personnel, or preparation for Pre-flight Military Training. Easy payment plan.

Check Course desired and mail coupon today for full details. No salesman will call.

- ☐ Private Pilot
- ☐ Commercial Pilot
- ☐ Instrument Rating
- ☐ Military Pre-flight
- ☐ Flight Instructor
- ☐ A & E Mechanic
- ☐ Control Tower Operator
- ☐ Aircraft Dispatcher
- ☐ Airline Transport Pilot
- ☐ Flight Engineer
- ☐ Link Trainer Instructor
- ☐ Ground Instructors (All ratings)

NAME.....

ADDRESS.....

CITY.....STATE.....

SEND TO:

FIELDING AVIATION CORRESPONDENCE SCHOOL

P.O. Box 3132 M.S.S. Tallahassee, Fla.

$64,700 $64,700

LOCKHEED LODESTAR

Remmert-Werner Conversion

Dual Instrumentation
One-Piece Windshield
Anti-icing System
Electric Booster Pumps
Dual Fuel System
24 V Electrical System
Complete Lavatory
Dual Collins Omni
Dual Bendix ADF's
Complete Galley
Collins Transmitter
LVTR-36 Transreceiver
Isolation Amplifier

Will Trade

JACK ADAMS AIRCRAFT SALES, INC.

P. O. Box 5446
MEMPHIS 16, TENNESSEE
Phone EX 1-4436

(Continued from page 72)

set. We decided to make the best of it. We had only used about half of our fresh water and now elected to take a bucket bath. First though, the airship must be thoroughly scrubbed. We made the *Snowbird* immaculate. Then, each man bathed, shaved, and donned his clean flying suit.

All day we had avoided Key West. My former duty assignment had been with the Airship Development Squadron there. Now, that squadron would be our host. It was like old home week for me, so I contacted the squadron duty officer by radio. He told me a runway was under construction and suggested we fly over for a look at the landing site. He mentioned parking the blimp next to the grandstand. When I asked what grandstand, he said one had been set up and the public had been invited to the affair. Admiral Halsey was there and dignitaries from Washington! We were shook up. Our uniforms were aboard the Constellation down on the field. Five of the crew had no hats. One had decided to wear bedroom slippers instead of uniform shoes during the flight. We were in sorry shape for an official function. I got Lt. Commander Chrupcala, the pilot of the Connie on the radio and told him our problem. He agreed to rummage the luggage, find the hats, shoes, etc. and beat the Admirals to the airship when it landed—without being detected. It took some doing, but he made it.

Everything was set at long last. A few minutes before landing time, we started the other engine and requested permission of the tower to land. It was a great thrill after so many days in the air. When we were finally on the mooring mast and had been taxied to a position in front of the grandstand, we were amazed by the excitement. A Navy band was playing "Anchors Aweigh," flashbulbs were popping and people were rushing out to meet us. The first person I recognized as I stepped out of the airship was Donna. She came running to embrace me. Was she beautiful! Admiral Halsey personally congratulated each member of the crew. Then, we were escorted in front of the grandstand where Admiral Kivette spoke of what our success meant. Admiral Halsey, to my joy, pinned a Distinguished Flying Cross on my flight suit. Then, Admiral Kivette read a special commendation for the whole crew from Admiral Burke. After all this we were able to talk with our friends and shipmates from the Super Connie. And at last—what we were all itching for—that long awaited shower!

What does this flight mean in terms of the future? It is too early to tell. Airships have many assets. They are often contrasted with airplanes. This is in error. Their role should be to supplement not supplant the airplane. We, in America, have a virtual monopoly on the helium supply of the world, which can serve us well. Special detection equipment can be vitally and economically employed if proper design and judicious use of airships is pursued. The flight of the *Snowbird* points to a concept wherein the airship offers many possibilities for military or commercial application. END

Is an Ultra-Light the Answer?

(Continued from page 51)

tured in 20- and 25-hp models; two-cylinder horizontally opposed engines producing from 25 to 30 hp, such as the Aeronca E-107-A, the Cleone, the Long B-87, and the Cyclomotor. Heath converted the four-cylinder vertical in line Henderson motorcycle engine for use in his aircraft. The 40-hp Anzani and the A.B.C. Scorpion engines were also popular.

Ed Heath, one of the most prolific of the ultra-light builders, offered three designs, the low-wing, mid-wing, and high-wing parasol. His planes sold for as low as $975 FAF. In addition, he pioneered sport planes in kit form to be assembled by the home-builder. A complete set of parts to assemble any one of his three models sold for $199. The wings of Heath airplanes could be removed and stowed alongside the fuselage so the whole plane could be towed behind an automobile and stored in the family garage. The most popular of all these models was the single-place Parasol. Its wings, which weighed 18 pounds each, were of conventional design and construction—spruce spars and ribs with rounded steel tubing at the wingtips. The wing panels pinned together without a center section and were supported above the fuselage by two sets of vee struts, one fore and one aft of the cockpit. Two parallel steel struts from the bottom of the fuselage reaching out about 60 per cent of the wing's length also supported each wing. A six-gallon, gravity-feed fuel tank, enough for four hours of operation, was located in the wing. Powered with a 27-hp Heath-Henderson motorcycle engine, the Parasol had a top speed of 70 mph and a landing speed of 28 mph.

The Driggs Dart II, built by the Driggs Aircraft Corporation, Lansing, Mich., was a two-place biplane powered with a 40-hp Anzani engine. It had a top speed of 90 mph, with a stall speed of 30 mph. The fuselage was of welded chrome molybdenum steel tubing, fabric-covered. The wings were fabric-covered, with spruce spars and duralumin stamped ribs. Dual cockpit controls were standard equipment. Empty it weighed 380 pounds and had a gross weight of 720. Rate of climb was 650 fpm.

Another interesting ultra-light was the Buhl "Bull Pup," a single-place, high mid-wing, externally wire-braced monoplane built to take engines ranging from 40 to 80 hp. With a 45-hp Szekely, it had a top of 92 mph and landed at 32. One of its unique features was its production in several wing sizes—large wings for less horsepower and low speeds, smaller wings for more horsepower and higher speeds. The wings were of wood, fabric-covered, while the monocoupe fuselage was all metal, with tail surfaces of fabric-covered steel tubing. The Bull Pup sold for $1,250.

The single-place Aeronca C-2, powered with a 30-hp Aeronca engine, was introduced in March of 1930. It needed a take-off run of less than 75 feet. Performing beautiful acrobatics at the 1930 All American Air Show in Detroit, it soon

(Continued on page 76)

Mr. Fixed-Base Operator:

YOU CAN GIVE BETTER SERVICE AT LOWER COST

If you see the Bendix Distributor nearest you

Whenever you need parts or units for Bendix* carburetion or landing gear equipment, see your nearest Bendix Distributor. He's the man who can save you money by reducing your inventory and eliminating transportation and follow-up costs.

Also, when you buy from the Bendix Distributor, obsolescence is held to a minimum and you effect substantial savings on insurance, storage space, taxes and product deterioration.

Sounds like a lot to promise, but, if you will get in touch with your nearest Bendix Distributor, he will be glad to demonstrate just how the program works.

*TRADE-MARK

Airwork Corporation
Miami, Florida

Airwork Corporation
Atlanta, Georgia

Airwork Corporation
Alexandria, Virginia

Aviation Electric, Ltd.
Montreal, Canada

Aviation Electric Pacific, Ltd.
Vancouver A.M.F., B.C.

W. J. Connell Company
Newton Upper Falls, Massachusetts

General Aircraft Supply Corporation
Detroit, Michigan

Pacific Airmotive Corporation
Burbank, California

Pacific Airmotive Corporation
Kansas City, Kansas

Pacific Airmotive Corporation
Oakland, California

Pacific Airmotive Corporation
Seattle, Washington

Reeve Alaska Airmotive
Anchorage, Alaska

Southwest Airmotive Company
Dallas, Texas

Southwest Airmotive Company
Rocky Mountain Division
Denver, Colorado

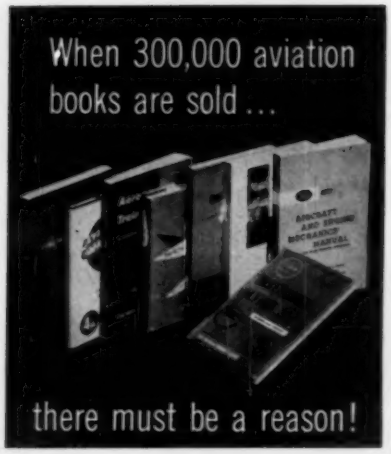
Standard Aircraft Equipment Co.
Mineola, L.I., New York

Van Dusen Aircraft Supplies
Minneapolis, Minnesota

Wheels, brakes and shock-absorbing struts. Carburetors, direct fuel injection systems and control systems for jet engines.

Bendix PRODUCTS DIVISION South Bend, Ind.

Bendix AVIATION CORPORATION



reason: these are the only complete guides to all CAA ratings

the popular Zweng Manuals, each with complete text and latest typical examinations

☐ PRIVATE & COMMERCIAL PILOT RATINGS. Both ratings in one timely book. With new cross-country written examinations. $4.00

☐ INSTRUMENT RATING. Up-to-date, complete, illustrated, and concise. $5.00

☐ AIRLINE TRANSPORT PILOT RATING. Used by the airlines in their own pilot-training courses. 1958 edition. $5.50

☐ AIRCRAFT & ENGINE MECHANICS' RATINGS. Two ratings in one book. The only complete guide available. $5.00

☐ FLIGHT ENGINEERS MANUAL. If you have an A. & E. rating this book will make you a flight engineer now. $5.00

☐ FLYING THE OMNIRANGE. This book shows you how simple omni flying can be. With typical omni flight. Illus. $4.00

☐ MANUAL OF THE E-6B COMPUTER. Over 400 problems solved and explained. $3.00

☐ THE AMERICAN FLIGHT NAVIGATOR. New, the first really practical guide to this coveted professional airline rating. $6.50

☐ SAFETY AFTER SOLO. 356 p. $4.75

☐ HELICOPTER PILOT RATINGS. 1958 edition, with revised text and new cross-country written examinations. $5.00

Check the items you want, fill in the blanks below, then clip this ad and send it to:

PAN AMERICAN NAVIGATION SERVICE
12021 Ventura Blvd., F-4
North Hollywood, Calif.

☐ Payment enclosed ☐ Send C.O.D.
☐ Send me a free copy of your complete catalogue.

Name_____

Street_____

City & State_____

(Continued from page 75)

became the fastest selling plane in America. Stanley C. Huffman flew a C-2 from Cincinnati to New York in 10:10 hours, and on another occasion kept one in the air for 26 continuous hours, covering nearly 1,900 miles. A two-place Aeronca C-3, equipped with a 40-hp engine, placed first in its class in the Ford Reliability Tour of 1931.

Aeronca thus spurred the low-cost plane movement which had originated with the ultra-lights. Shortly, aircraft such as the American Eaglet; Curtiss Wright, Jr.; Alexander D-1 and D-2; Corben Baby Ace (an improved model of which is again in production by Paul Poberezny of the Experimental Aircraft Association); the Taylor Cub; the Nicholas Beazley MB 3 and MB 5; and the Buzzard Light Plane (in reality a motor glider) were offered to the market.

The depression, coupled with stringent government regulations requiring expensive engineering analyses to secure an airworthiness certificate, brought about the demise of the ultra-light movement.

Following WWII there came a resurgence of interest in ultra-light aircraft in England. An Ultra-Light Aircraft Association was formed to promote development of such machines by established manufacturers and home builders. Later this group was reorganized to include lightplanes in the promotion effort. A similar enthusiasm was generated in France. More than a dozen designs of ultra-lights have evolved there. The French likewise overhauled their government regulations to stimulate initiative and permit more freedom to potential builders. This has been effective in breaking down a long existing apathy.

Now, what are the possibilities of ultra-light trends in the United States? Will there emerge from the activities of the Experimental Aircraft Builders and the Midget Racing Association, fresh ingenuities and ideas to this end? Will some fertile brain in the Civil Aeronautics Administration come up with workable regulations which require adequate stress analysis for the ultra-lights but deliver them from A.T.C. requirements necessary for complicated, high speed aircraft categories. Or is any of this in the realm of possibility?

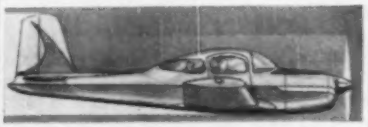
Probably no one can be sure but, in our estimate, there must be reasonable checks and tests and restrictions which could achieve safety without the outlay of enormous costs beyond the pocketbook of ultra-light plane development. We would be the last people in the world to gamble with the safety of ultra-lights and their potential users but we doubt not that exploration of the subject would turn up solutions which could satisfy both the economics and the safety of this category.

Stits Aircraft, which has built a prototype ultra-light for research and developmental purposes, says such a plane could be placed on the market for $1,000 to $1,200. In kit form, it could sell for considerably less. Considering the degree of inflation that now exists, this estimated price is indeed reasonable. The ultra-

(Continued on page 77)

MEYER'S

— 200 —



ENGINEERED & DESIGNED to assure SUPERIOR PERFORMANCE

Spin Resistant

Gross Weight 3000 Lbs.
Empty Weight 1870 Lbs.
Tricycle Landing Gear
Continental 240 HP.
All Metal—Four Place
Cruise 185—Land 55
Range (Optional) 1000 Miles
360° Visibility

Write Today for Details

MEYER'S AIRCRAFT CO.
Tecumseh - Mich.
Dealer Inquiries Invited

ENJOY REALLY CLEAR WINDSHIELDS & WINDOWS

Here is the long-sought cleaner for aircraft plastic windshields, canopies and windows.

CERBINI PLASTIC CLEANER

Does the job safely, surely and quickly on vinyl plastics, Plexiglas and Lucite windshields, etc. It's non-crazing, anti-static and leaves no polish dust. Won't scratch or soften the surface. Works like magic to dissolve away cloudy, opaque film and stains. Non-flammable. Write today for half-pint can—just $2.00 postpaid. (Dealer Inquiries Invited.)

MAIL TWO DOLLARS, YOUR NAME, ADDRESS TO:
CERBINI LABORATORIES, INC., DEPT. A.
P. O. BOX 2029, GRAND CENTRAL STATION, NEW YORK

AIRPLANES WANTED
FOR IMMEDIATE CASH

Highest prices paid for clean used aircraft—Twins and Single Engines—all categories wanted. Write, Wire or Phone ALL details for immediate cash offer. No delay.

World's Busiest Aircraft Dealer

GRAUBART AVIATION, INC.
540 N. Lake Shore Dr., Chicago 11, Ill.
Telephone MOhawk 4-6260

(Continued from page 76)

lights produced in the early 30's sold for $1,000 to $1,800. Improved production methods have greatly offset today's inflated dollar.

The Stits prototype, called the *Skeeto*, is a high-wing, single-place, parasol monoplane and has been used as a test bed for light-weight industrial engines ranging from 3½ to 20 hp. The airframe is constructed of aircraft spruce, plywood, and fabric, with the exception of the struts, landing gear, and motor mount

The English Dart Kitten III designed in 1936.

which are of chromoly tubing. All of the metal parts tie together for integral bracing. This simple type of wood and fabric construction readily lends itself to the home-builder. Factory-produced models would be turned out with welded chromoly tubing replacing the wood framework of the fuselage.

Suitable engines are no longer in production for aircraft of this category. In England the 36-hp Aeronca proved so successful for ultra-lights that surplus stocks in the United States were purchased by a British firm. However, during the years since World War II, a vast amount of progress has been made in the development of light-weight, air-cooled industrial engines which, with some modification, could be adapted for use in aircraft.

Used light aircraft are rapidly being priced out of the picture as far as the average person is concerned. If an ultra-light is the answer, now would seem to be an appropriate time for the matter to be considered. END

"I told you as soon as they got a bigger one than ours they'd start a fight!"

CESSNA SKYLANE with TACTAIR AUTOPILOT

Featured by Cessna as Optional Equipment

Until you fly the Cessna Skylane equipped with the Tactair Autopilot you have no conception of how effortless and relaxing flying can be. The smooth pneumatic controls take the bounce out of rough air. The amazing Tactair Heading Lock holds you precisely on course, taking all the effort out of flying VOR, ADF, or ILS courses.

Now you can order the great new 1958 Cessna Skylane (182 and 180 also) equipped with the Tactair Autopilot as optional factory-installed equipment. Or you can quickly and easily install the Tactair in your present Cessna Skylane, 182 or 180.

Cessna's choice of Tactair followed careful evaluation and field testing — a tribute to Tactair's proven reliability and performance. Available soon on the Cessna 310, too.

A FAR SUPERIOR AUTOPILOT SYSTEM

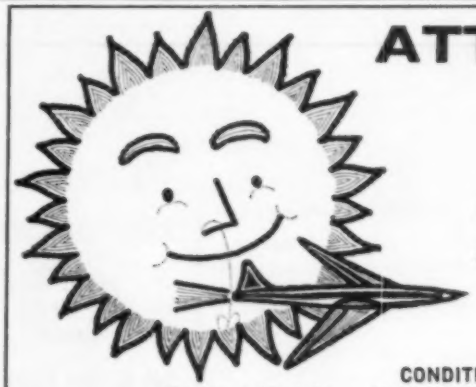
The Tactair T-3 operates pneumatically with no warm-up, no power drain, no tubes—so mechanically simple, yet so "human," that it makes any other flight system obsolete. Weighs only 7.3 pounds, simple to install, virtually maintenance-free.

WITH TRUE-READING HEADING LOCK

Tactair's heading lock works on the DG with no confusing zero heading. Merely set the upper card to course desired and you fly that course precisely. No complicated resetting for new course necessary.

TACTAIR® INCORPORATED AUTOPILOT DIVISION AIRCRAFT PRODUCTS CO. BRIDGEPORT, PENNSYLVANIA

For 18 Years Specialists in Precision Aircraft Pneumatic and Hydraulic Controls



ATTENTION

AIRPLANE DEALERS AND DISTRIBUTORS

We offer a complete nationwide financing and insurance service

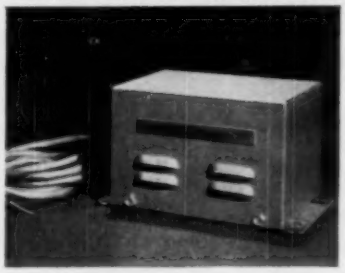
Jet action on time sales administered by our highly-trained staff

call or write

CONDITIONAL SALES CREDIT CORP.

120 West 42nd St. • New York 36, N. Y. • Wisconsin 7-5902

AUDIO
BOOSTER
AMPLIFIER
BOOSTS AUDIO POWER OUTPUT



MODEL TB12-1

In answer to requests from pilots and aircraft radio technicians for a power boost on aircraft radios, L.T. LABS have brought into production a transistorized audio booster amplifier permitting pilots to listen with ease even under high ambient noise levels.

Audio Booster Amplifier will boost average aircraft radios with 1 watt output to 12 watts maximum; frequency response is excellent for clear speaker performance. Volume is still controlled by the volume control on radio and a 5 ft. cable and tinnerman clips are provided for easy positioning, even in remote places. Size: height - 3 1/4 inches, width - 3 3/4 inches, depth - 5 inches. Weight - 2 1/2 pounds.

$43.50

Write direct to:

LT LABS Beach and Sheridan Rd. Waukegan, Illinois

Helicopter on Instruments

(Continued from page 33)

If we can establish that there is no valid reason why commercial helicopters need ever be operated "on instruments" and at the same time that they can fly "around the clock," can we perhaps eliminate instrument flight techniques at destination?

As I see it, the answer is an unqualified "yes," as long as the heliport is not in the center of a metropolitan area. Landing and take-off is easily accomplished in a helicopter. If visual-dead-reckoning can locate the landing area, the landing takes care of itself.

This, then, places whatever instrument flight is necessary for successful operation solely with entering and leaving a metropolitan complex such as New York City.

This problem is much too complicated to be treated here but the answer possibly lies in some superior form of radar presentation. Since there appears no solution to this in the immediate future, the only alternative is to land on the perimeter of the city during the small percentage of time that weather so dictates.

So far I have made no mention of navigational aids. I do not feel their improvement over dead reckoning would justify their cost. This theory, pro and con, is well developed in a report prepared by the Stanford Research Institute entitled, "Helicopter Navigation Requirements" by F. Dorn Barclay and Gordon S. Wiley, and dated September 1955. In the case of scheduled operations, particularly, I would suggest a sufficient number of visual markers, illuminated at night, as being a better and much less expensive method of navigation than any present form of electronic aid. In addition to being far less costly, they would furnish an excellent means of safe traffic control if identifiable by numbers. Such numbers could be the actual number of miles either to or from a destination. Pilots of all operating helicopters could know, by voice radio, the exact position of every other helicopter at any given time and place.

Now one other advantage remains in having all helicopter operations under Visual Flight Rules—absence of necessity to file flight plans for Instrument Clearance from existing fixed-wing air terminals. This, I feel, can be solved by keeping approach altitudes at least 100 feet below those required for the base leg of fixed-wing aircraft landing on instruments; and a straight-in approach heading to the airport terminal 90 degrees from the active instrument runway in use, the approach to be made, of course, over an area other than the airport. This, or some similar method, should allow helicopters to approach, land, and take off visually at any time fixed-wing planes are allowed to operate on instruments (200 feet and one-half mile).

Since there is no conceivable need for helicopters at any time to occupy any

A **Graubart Plane** is as near as your phone...

Largest selection of some of the cleanest Used Aircraft in the world.

1946 Cessna 140; 336 hrs since Major; Wings Recovered; in Top Condition $2395

1947 PA-12 Super Cruiser; Engine Majored; New Fabric; really a Doll! $2695

1948 Cessna 170; 750 hrs since Major; Recent License; fair condition $2950

1953 Piper Super Custom Tri-Pacer; 450 hrs since Major; Omni; Gyros; Very Clean! $3950

1952 Cessna 170-B; 490 hrs since New; Omnigator; Many Xtras; Ultra Nice $5295

1956 Piper Super Custom Tri-Pacer; 390 hrs; Omni; Gyros, etc.; Excellent for only $5750

1947 Bonanza; 1200 hrs Total, 536 hrs since Major; Omni; VFH-LF; Other Extras; Clean $6950

1955 Cessna 180; 450 hrs since new! Omni; ADF; Beautifully enameled Blue & White $8950

1956 Cessna 182; 365 hrs; All over Olive & Green paint; Omni; Gyros, etc.; Clean $9650

1953 D-35 Bonanza; 225 hp! 250 hr remfg. Engines; ADF; Omni; Like New $11,900

1956 G-35 Bonanza; 190 hrs Total! ADF; Omni; Like New $16,900

1957 H-35 Bonanza; 260 hrs! Omni; ADF; Beautiful Condition. $18,900

G-44-A Grumman Widgeon; Beautiful Amphibian; Was Corporate Owned; Excellent Radio $22,900

1954 Cessna 310; Factory modified '55 spec; 600 hrs T.T.; 250 hrs L.E.; 35 hrs R.E.; Excel. Radio; 1958 Paint $30,900

1954 520 Aero-Commander; Loaded with good Radio; 200 hrs Remfg. Engines; 3-blade props $36,500

1956 Cessna 310; Only 172 hrs! List $70,000 Our Price ..... $44,900!

Many, many more in stock at our Porter County Airport Base, at Valparaiso, Indiana.

Aircraft Radios—Used

Narco Superhomer	$295
Narco VC-12 Simplexer	$295
Narco VC-27 Small Pwr.	$425
Narco VC-27 Large Pwr.	$475
Narco Omnigators	$450
Narco 360/560 Sapphire	$2495
Lear ADF—12's	$450
(with sealed loop)	$595
Wilcox ADF's	$1950

Check Us First For Used Equipment! Auto-Pilots, etc.

ALSO

For New Radio and Auto-Pilot Equipment in all catagories.

We Trade! Submit specifics on your present plane or equipment. We will write, wire, or phone difference price.

Easy Financing Available — up to 36 months!

☐ Enclosed is $1.00 for 24 issues of Aircraft Inventory & Helpful Hints.

☐ Please Send immediate FREE information on a _____ aircraft. If not in stock, send specific details the moment you have one.

GRAUBART AVIATION, 540 N. Lake Shore Dr. CHICAGO 11, ILLINOIS

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Graubart Aviation Inc.

540 N. Lake Shore Dr. CHICAGO, ILL. • Phone: MOhawk 4-6260

WIN YOUR PILOT RATING

(Private or Commercial)
You'll need this book

From "THE GROUND UP"

Tenth Revised Edition

A concise ground school manual written in simple, elementary non-technical language.

COVERS AIRMANSHIP—THEORY OF FLIGHT — METEOROLOGY — RADIO — AERO ENGINES — AIRFRAMES — CONTROLLED VFR—AIR NAVIGATION

Explains and Solves 193 Examination Questions.

$5.00 Postpaid — **59,000** copies in use

AVIATION SERVICE CORP.
Port Credit, Ontario, Canada

VISUAL TRAINING

OF CANDIDATES FOR
PILOT RATING

To Meet Eyesight Requirements of C.A.A. or Air Force Exams

DR. JOHN T. FLYNN
OPTOMETRIST - ORTHOPTIST
Visual Training Specialist
300 W. 23rd St., New York City

part of the air or ground used for fixed-wing landing or taking off, there should be no logical reason why the helicopter must ask permission to operate under the multitudinous array of "legal" clap-trap that besets the pilot of fixed-wing aircraft. A statement that he is arriving or departing should be all that is required of the helicopter pilot. Control of other helicopters logically should be handled by voice and sight of the pilots themselves and by intelligent scheduling.

Far too much money, time, and energy has been devoted to finding a navigational aid for a machine that needs it like the proverbial hole in the head. Realistic legislation is what is really needed by helicopter operators insofar as all-weather flight is concerned. Such legislation could save untold sums of money yet to be spent on some form of costly instrumentation, and the attendant cost of qualifying pilots.

The money could be spent much more usefully in developing more simplified machines with fewer maintenance problems. The helicopter can presently fulfill much of its promise as a useful, competing form of air transportation just as it stands today, insofar as weather is concerned, if operators and legislators can so agree.

There will be compromises, yes, but at least the show will be on the road. The really great development effort should be devoted to the machine itself so it can economically compete and, thereby, survive.

END

The thoughts expressed in this article are solely those of the author and no thought, expressed or implied, is necessarily that of any other person.

NEW Portable
weatherman radio

Complete periodic weather reports on low frequency range!
. . . just push a button for Standard Broadcast

Using the new WEATHERMAN Portable Radio. It is now possible to receive weather information before leaving on a flight, take the radio with you for a possible standby set, and use it in your hotel room for weather information and broadcast band operation.

The Weatherman is portable, lightweight (only 3½ pounds); measures 8" long and 5" high; operates on 110 volts AC/DC or on batteries. The carrying handle folds into case.

The Built-in loop stick antenna is directional in operation and can be used in an emergency, as a direction finding radio. A second whip-type antenna extends from the case to 29" high.

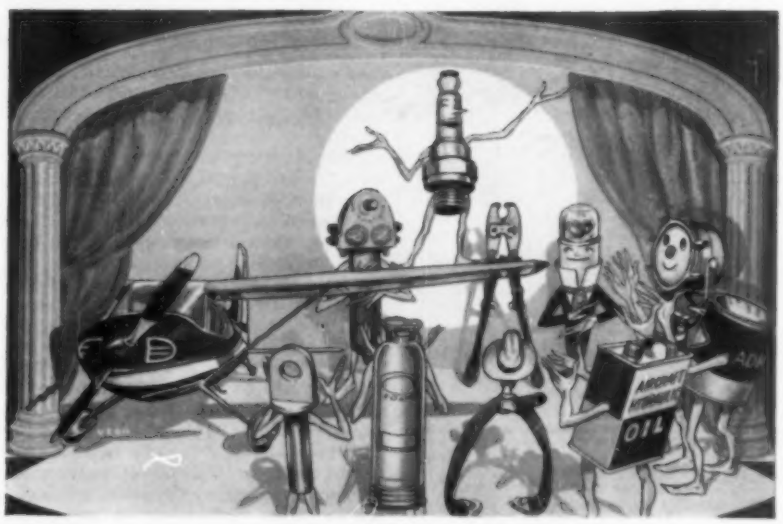
The Weatherman operates either built-in speaker or earphones. Has two earphone jacks, and comes complete with one miniature earphone. (Batteries are not included.)

$6495 Write direct to:
LT.LABS-Beach & Sheridan Rd.
Waukegan, Ill.

"We Play a Leading Role in Flight-Line Maintenance"

Mechanics agree that they do their best maintenance work when they have good materials to work with. That's why they applaud so enthusiastically for the top-quality maintenance supplies and equipment offered by Air Associates.

Air Associates carries the largest stock of aviation parts and supplies in the nation. All its items are fully tested...always available...and brought to you at prices made possible by volume purchasing.



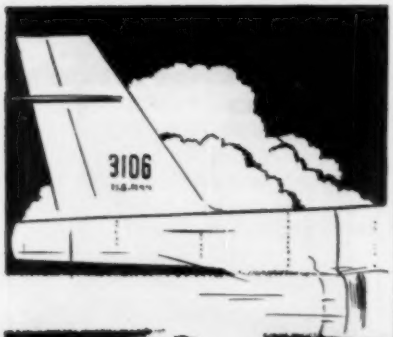
Department Store of the Air

To serve the nation in aviation, there are Air Associates branches at . . .

Atlanta, Ga.
Chicago, Ill.
Dallas, Tex.
Glendale, Calif.
Miami, Fla.
San Francisco, Calif.
Teterboro, N. J.

AIR ASSOCIATES

A division of Electronic Communications, Inc.



The Ultimate in

AVIATION EDUCATION

is yours at

PARKS

COLLEGE OF SAINT LOUIS UNIVERSITY

Now as never before, the aviation industry needs competent young men . . . and the industry knows that PARKSMEN are properly prepared for the job ahead!

The PARKS graduate has the advantage of having an education that is so complete and thorough that he can advance more rapidly. Typically, a PARKSMAN during this first year on the job in aviation has earned more than the total cost of his training.

Many PARKSMEN are today's leaders of Aviation and they welcome new PARKS graduates because they know the calibre of PARKS training. Longer vacations, better pay and improved retirement programs make aviation more attractive than ever. These special benefits may be yours as a PARKSMAN.

Founded in 1927, PARKS COLLEGE has the distinction of being the nation's first Federally-Approved Aviation College.

30 YEARS OF AVIATION EDUCATION
PARKS COLLEGE
1927•1957

GET THIS BOOK
Page after page of pictures describe how PARKS students live and learn.

MAIL THE COUPON NOW!

PARKS COLLEGE, HARPER HALL
East St. Louis, Ill.
Please send View Book
I am interested in:
- ☐ Aeronautical Administration
- ☐ Aeronautical Engineering
- ☐ Aircraft Maintenance Engineering
- ☐ Aeronautical Meteorology
- ☐ Flight Courses
- ☐ A & E Course
- ☐ Information on Public Law 550

Name..... Age.....
Address..... Zone.....
City..... State.....

100 SQUARE MILES

IN THE FLICK OF AN EYE a camera's lens caught 100 square miles of Arizona landscape with the Sierra Estrelita Mountains in relief below and the Gila River winding through the valley. Photographed from an RF-101, McDonnell Voodoo, this is the first taken with a standard mapping camera under controlled conditions at supersonic speed.

What—No Thrills Left?

(Continued from page 47)

over the open water. The most I had ever previously flown over water was a five-mile hop from Sebewaing, Mich., to Bay City and then I was within gliding distance of shore all the way.

I remember now about keeping a sharp eye peeled, so I start a neck-swiveling act. I can see now what they mean about pilots of big ships not watching where they are going. What with watching the gyro compass, checking the sensitive altimeter, keeping an eye on the artificial horizon and the ball-bank as well as a casual eye on the other instruments stretched out along the panel, I found I didn't have much time to enjoy the scenery. I saw less of the country than I had ever seen before on a trip.

Twelve minutes—and there's Cleveland dead ahead. I glance around more now. There's a plane approaching at two o'clock on a collision course, but several hundred feet below us. I'll watch that pilot pretty closely and be ready in case he suddenly decides to climb. Guess I'd better call Frank's attention to the ship.

"Plane at two o'clock," I call out.

"I see him," Frank answers.

Now I change course a couple of points and Frank tunes in Youngstown on the Omni. Youngstown is 114.7 and we are right on course. I'm watching the ADF needle now as well as the gyro compass. It's the first time I've ever flown with Omni or on a national airway. We are on Green 3 and I listen for the A or N. Frank asks for the mike. I pass it over. Right away Frank is making like an old customer on a party line telephone. At last Youngstown answers. Frank switches on the loud speaker. We have the tower now. Gosh that guy talks fast. We are 35 miles out, or about 11 minutes and 30 seconds away. We are to call when ten miles out, or 3 minutes and 30 seconds.

Finally, we are cleared for a straight-in approach. We won't have to fiddle around with a "hold." I would have liked to see how it is done. There's the runway right ahead and Frank takes over to make the landing. Would I have liked to try it? Sure—but, why use up all the thrills on one flight? I don't have to gather up all the diamonds on my acre at one time. END

A show designed with you in mind!

THE HISTORY OF FLIGHT

AN AVIATION EXPOSITION
TO STIMULATE INTEREST
IN AVIATION
ALLEGHENY COUNTY AIRPORT
PITTSBURGH

JULY 4·5·6

PIONEER AIRMAN BANQUET
JULY 3 • 7:30 P.M.

Featuring . . .
ANTIQUE & EXPERIMENTAL AIRCRAFT • CASH PRIZES • FLY-BY & EXHIBIT OF PRESENT-DAY AIRCRAFT • STATIC DISPLAYS • PRECISION AERIAL ACROBATIC DEMONSTRATIONS • MILITARY AERIAL AND GROUND DISPLAYS

WRITE, WIRE or PHONE
for information, reservations and tickets

ALL AMERICAN AVIATION EXPOSITIONS, INC.
210 Semple St.
Pittsburgh 13, Pa. Museum 3-6300

Notice to Organizations:
WE ARE NOW BOOKING
BILL SWEET'S NATIONAL AIR SHOW
10 ACTS

GOLD ISLAND

In Lake Vermilion (Minnesota)
21.75 acres
about 2,200 feet of lakeshore

Comprises entire northeast end of island; ideal for own estate and privacy. Several attractive building sites.

Lake Vermilion is 30 miles long, near the Canadian border, and adjoins the Superior National Forest, a 4,000,000 acre roadless area reserve.

Price $3,000.00, $400.00 down and $33.00 a month with 6% interest on contract. Title certified by the State of Minnesota.

LAKESITES LAND CO.
5506 W. Division St., Chicago 51, Ill.
Phone MAnsfield 6-1912

Night Owl

(Continued from page 31)

day winds are sisters in Kansas—both unpredictable.

Night check-outs began with wheel landings using runway lights only. Landing at night is actually simplified for the student because of the reduced field of vision and the consequent magnification of the well-marked runway lights. Calm nights provided no particular problems and a powerstall final approach was used after a somewhat faster-than-normal glide, to within about 15 feet above the runway.

After landing and take-off check-outs for everyone, the normal flight syllabus was resumed. Turns, stalls, spins, in fact, all airwork was practiced, both dual and solo, using the lights of the city as a heading check.

Cross-countries were laid out on two triangles. One ran 42 miles unlighted to Wichita to pick up the Kansas City-Wichita Airway; then northeast toward Kansas City, 40 miles on the airway. The third leg was approximately 68 miles homeward, unlighted but on a collision course with the main east-west highway. By turning south anywhere along the course, the highway could be picked up. The other triangle went out the same leg to Wichita; then toward Amarillo to a point directly south of home base; then an unlighted 45-mile leg back to Hutchinson. Both solo and dual cross-countries were flown in a loose three-plane formation led by a radio-equipped monitor who exercised constant surveillance over his charges.

The students ate it up. Starlight alone often gives sufficient vision to fly contact over thousands of square miles of the plains country of the U.S., where even the section lines are visible in clear weather.

To point up the potential that lies untouched by many fixed base operators, I offer the following recorded accomplishment. Shortly after beginning night operations, a new student enrolled. He had never been in an airplane. After a full discussion of his job and working hours, it was apparent that he had to train after dark or not at all. He said this was satisfactory to him. It was decided that he would fly his entire private license course at night. He was given the standard flight syllabus required by CAA for a private license. He proved an above-average student and could have been soloed safely in six-and-a-half hours but I carried him the eight hours required in an approved school. He did power approaches and wheel landings the fourth hour after solo and carried out solo maneuvers in the practice area used for day flight. At that time, the curriculum required spins which he did with precision, using the city lights for a heading. Night cross-countries, dual and solo, were flown on the circuit previously described.

At the conclusion of his private license course, I gave this student a "license" check ride, including one and two-turn spin recovery. He passed easily. His time was logged completely 25 night flights from first ride to license, with a single

(Continued on page 82)

You are
TOPS in AVIATION
when you get your EDUCATION at

PARKS

COLLEGE OF SAINT LOUIS UNIVERSITY

There's a future waiting for you when you choose Aviation as a career . . . and being a PARKSMAN adds to your prestige.

PARKS offers to you the advantage of a Bachelor of Science degree in 3 years instead of 4 . . . and there is no elimination of subjects. Classes are held for 45 weeks out of the year. Such an accelerated program permits PARKSMEN to start their careers nearly 1 year sooner.

EARN A B.S. DEGREE in Aeronautical Engineering or a BS degree in Aeronautics in Aeronautical Engineering, Maintenance Engineering, Aeronautical Administration.
(Air Force ROTC allows you to complete your education without interruption.)

Non-degree courses available — CAA Approved, A & E Mechanics — 45 weeks covering all phases of aircraft and engines.

Flight courses—Private, Commercial, Instrument, Instructor and Multi-engine Ratings.

All Parks Schooling is Approved for Veterans. Remember too, the PARKS faculty combines the talents of men holding advanced academic degrees as well as experts from the aviation industry.

PARKS offers only the most superior training and because this is a fact . . . enjoys an enviable reputation around the world!

30 YEARS OF AVIATION EDUCATION
PARKS COLLEGE
1927-1957

GET THIS BOOK
Page after page of pictures describe how PARKS students live and learn.
MAIL THE COUPON NOW!

PARKS COLLEGE, HARPER HALL
East St. Louis, Ill.
Please send View Book
I am interested in:
☐ Aeronautical Administration
☐ Aeronautical Engineering
☐ Aircraft Maintenance Engineering
☐ Aeronautical Meteorology
☐ Flight Courses
☐ A & E Course
☐ Information on Public Law 550

Name.....Age.....
Address.....Zone.....
City.....State.....

(Continued from page 81)

daylight entry. I will hazard a guess that this is the only license in the country so earned. Another calculated guess would be that Hutchinson, Kan. per capita of population, has more night-experienced pilots than any like area in America.

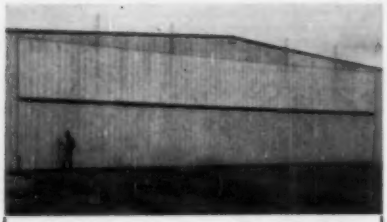
If you are one who believes that any future world conflict will be a push button affair with intercontinental ballistic missiles doing the scoring and little or no use will exist for pilots, the fact that they can be trained as well at night as during daylight, may be of little importance to you. On the other hand, if you are a work day captive and can learn to fly only after dinner, don't despair. It has and can be done without sweat.

This specialized training program which I instituted strictly for profit, established to my own satisfaction that pilots may be rapidly trained on an around-the-clock basis with ordinary traffic precautions. Given good equipment, and proper instruction, there is no need to fear that the engine is just waiting for darkness to make your life miserable. As a fixed-base operator, I had no accident of any kind in over two years of night training operation. The students exhibited a sense of responsibility and restraint not always found in daytime flight, and I never received a night "buzzing" complaint. There is an attraction about it that surpasses interest in daytime operation, and it is even more lucrative in the spring and summer months, when the airport is the social gathering for wives, friends and acquaintances. In my judgment hundreds of operations now locking up at sundown could gain full use of their overhead and depreciation and secure new profits.

In addition to personal gain, night training could tremendously help aviation by lighting up hundreds of fields which now go out of business at nightfall. Any reasonable type of equipment defining a runway is sufficient, if no fire hazard is created. The Hutchinson airport and its lighting facilities were perfect for my purpose but we could have gotten along well with far less elaborate installations. It is not the economics of lighting but rather the psychological block in regard to night training that constitutes the big hurdle. Yet I am sure there is a germ here for revitalization of community airports and private flying, and what a market for night flying accessories!

I have found night flying to be as safe as daylight flying for myself and scores of students over an 11 year period, and twice as interesting. And I believe that the fixed base operator who mounts "Operation Night Owl" on a sound basis, will find as much difference in his bank account, as the difference between day and night. END

ANSWER TO WHERE AM I?
(See page 64)
Windsor Castle, chief residence of English rulers, about 25 mi. west of London.



Low Rigid Frame Butler Door
Size 74' x 19'
Located at LaFayette, Indiana

Mosher Canopy-Bifold Electrical Door

Insulated door for heated storage hangar. Opens in one full complete panel.

For details write:

MOSHER MANUFACTURING COMPANY
421 Johnson St. N.E.
Minneapolis 13, Minn.
Phone: FEderal 9-4776

PAC-A-CHART ...the KEY to NAVIGATION ease

MR. JOHN MERCER

The Krilar Company's Airport Operator of the Month

Mr. Mercer is manager of the MCM Flying Service, Northway Airport, Columbus, Ohio. He has been active in aviation for 10 years. The MCM Flying Service was appointed distributors for Pac-A-Charts in 1957. Mr. Mercer said, "The Pac-A-Chart is ideal for all pilots and especially student pilots. I particularly like the time it saves me in planning flights and checking the flight planning of pilots that fly from my airport."

AIR ASSOCIATES, INC., Chicago 38, Illinois
SKYWAYS, INC., Troutdale, Oregon
STANDARD PRODUCTS, INC., Kansas City, Kansas
VAN DUSEN AIRCRAFT SUPPLIES, INC., Teterboro, New Jersey
MCM FLYING SERVICE, Columbus, Ohio

PAC-A-CHART . . . The Perfect Flight Aid

Helps you plan effectively, and fly as you plan . . . by providing all data at your fingertips . . . **prevents cockpit clutter.** The PAC-A-CHART is a zippered case, 13" x 19" . . . **just the right size.** The PAC-A-CHART permits repeated use of charts while preserving them. **Pays for itself.** Special course marker pencil included. THAT'S NOT ALL! There is a complete flight log, conveniently visible and usable at all times. (Of course, WAC and Sectional scales are included.) What's more, the PAC-A-CHART has an inner flight mat—in choice of colors—that contains a blank flight plan, weather information, phonetic alphabet and other data to make flying **SAFER.**

A MUST FOR EVERY PILOT.

- Outer Case of Clear Vinyl
- Complete Flight Data
- Course Marking Pencil
- Adds Up To Greater **SAFETY**
- **GUARANTEED**

Only $4.95
At Your Airport
or
Order Direct From
KRILAR COMPANY
81 East State St.
Columbus 15, Ohio

MAIL THIS COUPON TODAY!
KRILAR COMPANY
81 E. State St., Columbus 15, Ohio
CHECK COLOR DESIRED
☐ RED ☐ BLUE ☐ BROWN
NAME
ADDRESS
CITY STATE

Sharp Business Tool

(Continued from page 49)

this, and now, according to our chief engineer, the Super-Ventura's stall characteristics are the best in the field. We can sit there, with the control column full back, the ship shaking fully stalled, and fall through straight.

Also contributing to better stall characteristics were the changes made to improve single engine controlability. The original Ventura had more than enough rudder area for control, but the forces involved were such that even a strong man could not push the pedals at critical speed. On take-off, for instance, if one engine failed, the only alternative was to throttle back the good one, strictly against regulations as set in Part O4B. So here we had an airplane with adequate rudder area, unusable because no one had sufficient strength to push it. We installed a rudder tab spring boost. This handled 65 to 70 per cent of the rudder force and reduced the VMC (minimum control velocity) from the original 220 mph to 115 mph. However, the single engine performance was not greatly increased. There was still a given amount of rudder deflection for the given amount of horse power and speed. Therefore, to increase the single engine speed and climb we lengthened the fuselage by four feet. This improved the single engine speed by virtue of smaller rudder deflection and also gave a better single engine rate of climb. In the end we arrived at an airplane which with 2,000 hp engines has a VMC of 100 mph; with 2,400 hp the minimum control speed is 110 mph; and with the 2,500 hp engines it is 120 mph.

DAWYDOFF: Thank you Bud. Your answers give a good insight into Howard's end of the story. I'll now turn my questions to Harold Curtis, Chief Pilot of National Distillers. He flies the Super-Ventura with 2,400 hp CB-16 engines.

QUESTION: Why did National Distillers choose the Super-Ventura?

CURTIS: As you undoubtedly know, National Distillers is in the distillation business but also tremendously active in production of chemicals—everything from synthetic alcohol to polyethylene and exotic fuels. They also make metals for use in atomic submarine reactors. They own plants and sales offices from coast to coast and border to border including Puerto Rico and Canada. We constantly shift engineering, sales, accounting personnel and executives all over the country.

The airplane we had could no longer supply our need. We heard there were two or three Super Venturas in existence and contacted Howard for a demonstration. Its sound level was satisfactory, its speed unbelievable, and it handled like a dream. We had our company people take a ride. They were sold, provided Howard Aero facilities proved satisfactory. We flew down to inspect the factory. It was a factory, not just a shop hammering out conversions. We placed an order and took delivery nine months later. In the first six months, even though the flight and maintenance crews were fairly new to it, we operated the Super 400 hours. That's a lot for a 300 mph airplane.

QUESTION: How does the plane justify itself costwise?

CURTIS: In our company, a majority of flights are in the evening, after office work. The executives can put in a full day and hop 1,000 miles before supper to one or another plant. Without the Super each such trip by any other means would lose a good half day's productivity. A lot of them wouldn't bother to go. They'd send someone else on sales or engineering tours because they can't afford to be away from their offices for long. I know of many instances where sales contracts have been consummated because one of our top executives was on the spot. On that one single item of making executive time more productive, the Super Ventura is a money maker. No doubt about it—it's a business breeder. Our top people in engineering, sales, and legal departments are making more and more trips to customers and plants because of the Super Ventura. Also our one-day trips are increasing—out in the morning, back in the evening.

QUESTION: Can you give us some specific examples of your flight operations, such as elapsed time between points?

CURTIS: We can do as well as any scheduled DC-7 operations, and in some cases better. For example: New York to Chicago, with landing at the 3,900 foot downtown lakefront airport our time averages two hours, 35 minutes. Ten minutes later passengers are in a downtown hotel. No long taxi rides in from Midway or O'Hare. No time spent retrieving baggage. We can beat even the proposed jet schedules, although their air time will be only one hour, 20 minutes. From Louisville, Ky., to New York it takes us one hour, 50 minutes flying; Pittsburgh to New York, less than one hour. On long hauls such as N.Y.-Houston, our flight time is comparable to DC-7 non-stop.

QUESTION: The Super-Ventura is not pressurized. How do you feel about that considering that you have a fast, long range airplane capable of flying above weather and turbulence?

CURTIS: None of us like to use oxygen, and we very rarely have passengers use it. With our radar, range and speed, we dodge most weather—fly around it and pick areas of least turbulence. Possibly it is a handicap not to have pressurization, but there are a number of other considerations not all plus in its favor. One is the hourly cost basis—expense of maintaining a pressurization system. The fuselage skin requires extra surveillance and maintenance. Older pressurization operates as you know, on a tremendously high hydraulic pressure, and its numerous air coolers and ducts require constant attention and maintenance; all this greatly increases the operating cost of an airplane. We figure that flying a Super-Ventura 700 hours a year, the

PILOTS!
FLY SMART
KNOW WHAT'S AHEAD CROSS-COUNTRY
GET NEW 1958 EDITION
AIRPORT and BUSINESS FLYING DIRECTORY
AVIATION WEEK
PUBLISHED BY
A McGRAW-HILL PUBLICATION

ONLY $5

PLUS **FREE** FULL-SIZE, FULL-COLOR COAST AND GEODETIC PLANNING CHART

SAVE YOURSELF TIME, TROUBLE AND EXPENSE

Now get this indispensable cross-country flying aid that has won wide acclaim among multi-engine chief pilots; charter and air taxi pilots; instructors and fixed base operators and thousands of business and pleasure pilots. You'll find in the Directory many of the cross-country flying items you've always wanted in one source; and handy pocket size makes Directory quick-and-easy to use for pre-flight planning or in the air enroute.

AIRPORT FACILITIES
Complete facilities and services of over 6,000 airports listed by city and state. State maps show principal airport locations.

FLIGHT INFORMATION
Air navigation radio aids frequencies.
Flight weather and communication station phone numbers.
Out of country entry and exit requirements.
ADIZ Map.

RECOMMENDED MOTELS/HOTELS
Exclusive list of motels and hotels at or near airports including distance from airports, prices and airport pick-up and delivery service.

BUYING SPECIFICATIONS
Aircraft, navigation and communication equipment illustrations and specifications.

ACT NOW!
INSURE GETTING YOUR FREE FOUR-COLOR PLANNING CHART. SUPPLY LIMITED

See your local operator or mail coupon today!

AIRPORT & BUSINESS FLYING DIRECTORY
330 W. 42nd Street, New York 36, N. Y.

Please rush my copy of the AIRPORT AND BUSINESS FLYING DIRECTORY and my free four-color coast and geodetic planning chart.

NAME_____
ADDRESS_____
CITY_____ STATE_____

$5.00 enclosed ☐ $5.00 check enclosed ☐
Bill me ☐

SIMPLIFY NAVIGATION

With modern, easy-to-use Warner computers and plotters! Our devices are suitable for the student as well as the private, business executive, commercial and airline pilot. Every unit includes a basic 360° protractor which unquestionably simplifies the measurement of directions.

WARNER E-1 COMPUTER:

Most versatile of all modern computers. Combines a standard computer with a host of conversion markers, a 360° protractor, a runway computer, a pressure pattern computer and wind vector scales with no limit on air or wind speeds and which requires NO plotting for a quick solution.
List Price $6.50

WARNER PLOTTER:

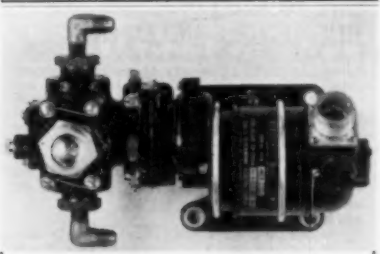
For years the best plotter on the market! Includes a straightedge with distance scales to fit the air navigation charts, a 360° protractor which is rotatable. This feature simplifies and reduces errors in plotting courses, bearings, wind vector solutions. Scales are provided for variation and deviation corrections, also for making off-course corrections from checkpoint information.
Statute Miles Scales $2.25
Nautical Miles Scales $2.75

WARNER PLOTTER-COMPUTER:

A combination device with all the features of the Warner Plotter PLUS a standard computer! The computer provides solutions for speed-distance-time, fuel consumption problems, conversions, air speed and altimeter corrections and a seconds index for approach procedures.
Statute Miles Scales $3.50
Nautical Miles Scales $4.00

Warner Instrument & Sales Company

4734 N. Austin Ave. • Chicago 30, Illinois



BONANZA OWNERS

Our electric auxiliary fuel pump, CAA approved for all Bonanzas starting with serial No. 1117, offers

- **FULLY AUTOMATIC STARTING, NO MORE HAND WOBBLING**
- **ADDED SAFETY OF DUAL FUEL PUMPS DURING TAKE-OFFS AND LANDINGS**
- **INSTANTANEOUS FUEL PRESSURE IN EMERGENCIES**

Only $160.00 complete with installation kit, and we guarantee each pump for 6 months!

GLUCKMANN AVIATION COMPANY
61 Lick Place, San Francisco 4, Calif.
Phone Yukon 6-5251

hourly cost is $275; at 500 hours a year, it is about $335 per hour. A comparable pressurized operation would run somewhat higher.

CLARK: May I inject something here? Our engineers have gone into this problem pretty thoroughly. Without doubt the Super Ventura can be pressurized, if there is a demand for it, but the additional cost would be in the neighborhood of $100,000 per airplane. We have always felt there would be a considerable payload penalty in a pressurized Super, but after an extensive search into all aspects of weight savings, it has been determined that even the most adequately equipped Super would not exceed an empty weight of 21,500 pounds, including additional structure and equipment needed for pressurization. This still allows approximately a 10,000 pound payload, and because of the vast improvement in performance, the Super Ventura is being favorably considered for a substantial gross weight increase.

DAWYDOFF: Thank you gentlemen both for the briefing and the cockpit check aloft to verify performance figures. I was very much impressed by the roominess of the pilot's office. The instrument panel is the most complete one I have yet seen in the aircraft of this type and the performance is scintillating, indeed. It is always a pleasure to hear two veteran pilots sound off so enthusiastically about an airplanc. Every plane that meets some unique need of our total national requirement helps nail the flag higher.

END

Whatever Became of the Curtiss Robin?

(Continued from page 54)

25 hours, five minutes, in another Robin.

When they landed the "St. Louis Robin" on July 30, 1929, Dale Jackson and Forest O'Brine had set a refueling endurance record of 420 hours and 21 minutes. They refueled 47 times from another Robin and worked from a catwalk welded to the fuselage to perform daily maintenance on the Challenger engine, including such chores as changing sparkplugs and points. Curtiss Wright sponsored the flight and paid the men $100 an hour for every hour they exceeded the old record of 247 hours. Altogether, Jackson and O'Brine earned over $31,000 between them for their 2½ weeks circling St. Louis.

In June, 1930, the Hunter brothers of Chicago, flew a Whirlwind Stinson to a new record of 553 hours, whereupon Jackson and O'Brine again went aloft and stayed up over 647 hours. Five years later, Fred and Al Keys of Meridian, Miss., flew the Wright-powered Robin "Ole Miss," for a new record of 653½ hours.

In 1938, Douglas Corrigan flew a Wright-powered Robin from New York to Ireland in 28 hours, 13 minutes. He became known as "Wrong-way Corrigan" when, on his arrival in Dublin, he solemnly announced that, since the Bureau of Air Commerce had refused to sanction his transocean attempt, he had planned a flight west from New York, but had

END PLANE UPKEEP

COVER YOUR PLANE WITH HERTER'S CHROME FIBERGLAS
C. A. A. approved

OR LET OUR CUSTOM PLANE COVERING PLANT DO IT FOR YOU.

- GUARANTEED FOR THE LIFE OF THE PLANE.
- WILL NOT ROT, NOR WEATHER.
- 5 TIMES THE STRENGTH OF STEEL YET LIGHT IN WEIGHT. INCREASES PLANE SPEED. DOES NOT SHORTEN STALL OUT.
- UNAFFECTED BY HAIL, SALT WATER OR SALT AIR
- ELIMINATES NECESSITY OF HANGARING
- GIVES YOUR PLANE A SKIN FAR SUPERIOR TO ALUMINUM OR FABRIC.
- COST IS LESS THAN ORDINARY FABRIC JOB.

WRITE TODAY FOR BOOKLET WITH FULL DETAILS. DEPT. 4-8-D

HERTER'S AIRCRAFT DIVISION
WASECA, MINNESOTA

We have moved

FLYING'S

editorial offices

to

ONE PARK AVENUE

NEW YORK 16, NEW YORK

LP LUMINOUS PLASTICS Aircraft WINDSHIELDS

IT'S A KNOWN FACT AROUND THE HANGAR THAT LP WINDSHIELDS ARE THE FINEST YOU'LL EVER FACE!

Manufactured under CAA parts manufacturer approval.

Sold by leading Aircraft Parts Distributors.

Manufactured by:

LUMINOUS PLASTICS, Inc.
Dept. F, 510 N. W. 1st Avenue
FORT LAUDERDALE, FLORIDA

gotten 180 degrees off in his navigation and landed in Dublin rather than Los Angeles. The Bureau advised him to come home, that all was forgiven, but suspended his license until sure that he was safely aboard a ship.

Robin production ended as the depression advanced and the St. Louis plant turned to other Curtiss models, including the "Kingbird" and the "Condor."

When you see some ancient Robin crop-dusting today, remember that in its time it made more headlines for the Air Age than has many a modern jet. END

ANNUAL MIAMI-HAVANA AIR CRUISE

SOME 300 planes are expected to participate in this year's annual Miami-Havana Air Cruise sponsored by the Florida Air Pilot's Association, May 10-14. The Cuban government will honor the tour by dedicating the new Baracoa Airport, some eight miles west of the Santa Fe field, on May 10. The group will take part in all the festivities of Cuban Aviation Day as well as the dedication. Additional features this year will include flights to the Isle of Pines, Cienfuegos, Mayajigua and Veradero Beach.

For details and registration, contact Tour Director James G. Pace, 310 S.E. Second Avenue, Miami, Fla.

Rebat®

...world's finest aircraft battery

First choice of men who build, own, fly and service aircraft.

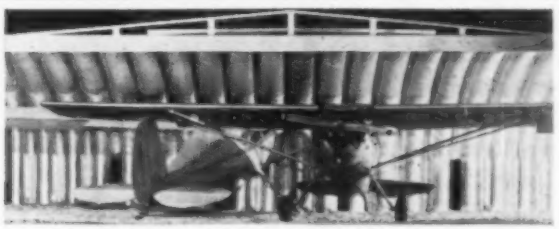
THE ELECTRIC AUTO-LITE COMPANY • BATTERY DIVISION • TOLEDO 1, OHIO

25x40 FT. HANGAR

INTRODUCTORY PRICE $774 F. O. B.

Government approved—withstands winds up to 140 MPH and heaviest snow loads.

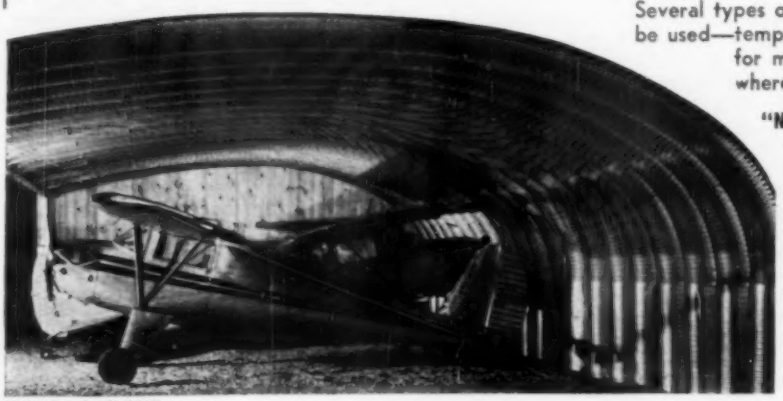
Erection time—2 men one day (Nonskilled). Front height opening adjustable from 7 to 10 ft. clearance. Additional hangars added easily 2 feet at a time. Absolutely no birds can roost in it. Clear span. No framing.



Does not include ends, doors or front support which are easily available locally.

Shipped complete with all heavy-gauge Corrugated galvanized steel panels, Weather-proof Bolts and Nuts along with assembly instructions.

Several types of foundations can be used—temporary or permanent. Easily disassembled for moving. Building can be jumped on anywhere, equal strength thruout. 10-day delivery.



"Now order from this convenient coupon."

DAMSCHRODER SALES CO.
Rt. 2, Clyde, Ohio

Gentlemen please ship ☐ 25x40 Ft. Hangar
☐ I enclose $774 each. ☐ $77 down pyt.
Bal. $697 C.O.D.

Name_____

Address_____

City_____ State_____

ceiling zero? be a hero with combination

MILE-O-GRAPH®
PRECISION MILEAGE MEASURER

You're always on the beam . . . find the shortest, fastest route with patented MILE-O-GRAPH! Easy as 1, 2, 3 to use. Fits into your flight suit pocket, saves guesswork and figuring air chart mileage. Adjusts to any scale. Ideal gift item.

1. to set scale, turn knob-end.
3. pointer shows exact mileage.
2. run wheel along route.

SETS TO SCALE OF ANY MAP

ONLY $2 EACH
3 FOR $5 GIFT-BOXED
MONEY-BACK GUARANTEE.
we pay postage on prepaid orders

MILE-O-GRAPH, INC., Dept. FL-4
117 Liberty St., New York 6, N. Y.
Please send . . . Mile-O-Graphs at $2 each or 3 for $5. Enclosed find $ ..... or send C.O.D. I will pay postman.

NAME .....
ADDRESS .....
CITY & STATE .....

BIG or SMALL they all SHINE BEST SHINE LONGER SHINE EASIER with

NEVR-DULL
Aluminum Cleaner and Polish

The original chemically-impregnated cotton wadding — Cleans quicker, gives higher, longer-lasting gloss, leaves protective film. Saves time, labor and money! Avoid inferior imitations.

AVAILABLE AT LEADING DISTRIBUTORS

MANUFACTURED EXCLUSIVELY BY
George BASCH Co.
19 Hanse Avenue, Freeport, L. I., N. Y.

Get the Most from Your Flaps

(Continued from page 50)

extended, it acts as an air brake. When only partially extended, air is forced through a gap and over the top of the flap resulting in an appreciable increase in lift (see photo).

In this discussion of flaps, the high-lift will be used as an example since it is standard equipment on the Cessna 170-B, 172, 180 and 182. The inherent stability designed into this type makes it possible to use it in any position from 0 degrees to 40 degrees within the placarded speed limits, without any necessary trimming.

To get the most out of any type flap it is wise to study the operational procedure recommended by the manufacturer. For instance, if you plan to use flap for take-off, be sure you have the control set for lift rather than drag. Check the degree setting for best lift versus least drag. Here is how it works out on the Cessna 182. Regardless of load, at 20 degrees (second notch) the plane will become airborne with the least amount of ground run. At this setting of 20 degrees, forward speed can be held about 70 mph on climb-out with the rate-of-climb around 800 fpm (average load). It follows that this is the best flap setting to climb over a hill, or obstruction which may lie directly ahead of the take-off runway. This setting of 20 degree flap also can be used for a mud or deep snow take-off. At the start of the run the nose of the ship is held a bit higher than normal. This attitude and flap position will lighten the aircraft in the shortest time and break it away from ground drag.

This flap setting does not, however, give the best rate-of-climb. With no flap it would take approximately 25 per cent more runway to break ground and around 90 mph for best climb of about 1,000 fpm. Without flap, the climb angle is shallower and the forward speed is greater. There is no advantage in using full flaps during take-off, as that position produces the highest drag.

One trick often used to make a take-off from a hard surface as quickly as possible, is to "pop" the flaps. This is accomplished by accelerating almost to take-off speed and then quickly applying 20 degrees of flap. If done properly, the airplane will literally jump into the air.

While there has been a great deal of controversy about the use of flaps in flight when encountering heavy turbulence, a close look at their effect would indicate that they will be of little help. In the first place, full flap is about as efficient as dragging an open parachute. Anything less in flap setting, while it permits extremely slow speeds, is usually a high-lift proposition and will tend to increase pressures—which we are attempting to avoid.

In slowing an aircraft to maneuvering speed, around 100 mph for the 182, the purpose is to place the aircraft in a speed range where gust loads will be moderate, and where sudden changes in speed will not bring the airspeed needle either over the red line or into the stall range. While partial flaps will aid in controlling the speed, the airplane can encounter gust

WHITE ANEMOMETER

- Accurate to within 2 per cent
- 0 to 50, and 0 to 120 m.p.h.
- No electricity required
- Handsome 5½" brass case • 5' aluminum mast in brass
- 4" easy-to-read dial
- 60' flexible cable
- Ideal for boat, club, home, camp, office, farm, airport, anywhere.

$47.50 postpaid

In chrome, $50. Circular Available.

A companion instrument, the WHITE Wind Direction Indicator, will be available about May 1.

W. O. WHITE & SONS, INC.
180 Atlantic Ave. Boston 10, Mass.

STITS PROPELLER SPINNER

C.A.A. APPROVED

For Installation on all Aircraft Using Fixed Pitch Props on Horiz. Opposed Engines thru 170 HP. Aeronca, Bellanca, Cessna, Champion, Commonwealth, Culver, Ercoupe, Funk, Swift, Interstate, Luscombe, Mooney, Piper, Porterfield, Stinson, Taylorcraft, Trojan, etc. etc. Aerodynamic Contour Increases Prop Hub Efficiency. Proven in Thousands of Hours Service to Decrease Oil & Cyl. Head Temp. Size 8" dia. x 11½" long. Installation Kit Includes all Parts & Complete Detailed, Illustrated Mounting Instructions. Each Prepaid $20.00

ORDER TODAY & DRESS UP YOUR AIRPLANE
Dealers Inquiries Invited
STITS AIRCRAFT, P. O. Box 3084F, Riverside, Calif.

ENGINEERING DEGREE IN 27 MONTHS

B.S. Degree, Aero., Chem., Civil, Elec., Mech. & Electronic Eng. (inc. Radio, TV). 36 mo. B.S. degree in Math., Chem., Physics. Prep courses. Demand for grads. Spacious campus. 20 bldgs.; dorms, auditorium, gym. Low rate. Earn board. G.I. appr. Enter June, Sept., Dec., March. Catalog. 1248 E. Washington Blvd., Fort Wayne 2, Indiana.

Keeping pace with progress

INDIANA TECHNICAL COLLEGE

OXYGEN EQUIPMENT
SALES & SERVICE
REGULATORS—MASKS—VALVES
PORTABLES & CYLINDERS
FIXED INSTALLATIONS
GOV'T APPROVED REPAIR STATION
ZEP AERO Phone: ORegon 8-1161 EL SEGUNDO, CALIFORNIA

WEAR YOUR PLANE AROUND YOUR NECK
Tastefully hand-painted on a quality necktie
Cessna, Beech, Piper, T'craft, others
Send info on make, model and $3.00 to
PERSONALIZED NECKWEAR
Box 8, Creamery, Penna.

ADF CALCULATOR
Take the "head-figuring" out of ADF calculations with this handy, simple-to-use, slide-rule type calculator. It ties down the mental arithmetic. Just turn the scale to get the relationship between magnetic heading, relative bearing, and headings to and from the station. Get full use from your ADF! Send $2.00 in cash, check, or money order for your ADF CALCULATOR and a reprint of Leighton Collins' article, "Getting the most from your ADF."
NAVAIDS, BOX 1231F, TRYON, N. C.

Be the
MOST PAMPERED FLYER
in the Keys!

How far can you go to please a guest? Well, look how far Jack Tar goes! Marathon Landing Strip right across the street (hard surface, 8,000'). Fishing gear, boat rentals, etc. 125 air conditioned rooms. Delightful ocean cabana club. "Skyline" Swimming Pool. Cocktail Lounge. Restaurant. Write F. F. McInnis, Mgr., for folder and rates (which are very reasonable, by the way).

Jack Tar HOTEL
in The Keys
US Hwy No. 1, Marathon Shores, Florida

YOUR COPIES OF
FLYING
ARE VALUABLE!

Keep them neat . . . clean . . . ready for instant reference!

Now you can keep a year's copies of FLYING in a rich-looking leatherette file that makes it easy to locate any issue for ready reference.

Specially designed for FLYING, this handy file—with its distinctive, washable Kivar cover and 16-carat gold leaf lettering—not only looks good but keeps every issue neat, clean and orderly.

So don't risk tearing and soiling your copies of FLYING—always a ready source of valuable information. Order several of these FLYING volume files today. They are $2.50 each, postpaid—3 for $7.00, or 6 for $13.00. Satisfaction guaranteed, or your money back.

JESSE JONES BOX CORP.
Dept. F
Box 5120, Philadelphia 41, Pa.
(Established 1843)

loads over the top limit for use of flaps. For the 182 this top limit is 100 mph.

However, there are many times when flaps can be used to advantage to slow an aircraft in level flight—aerial photography, inspection work, wildlife control, etc. Also, flaps can be used to curb the speed of a faster aircraft in a traffic pattern with slower ones and enable a pilot to maintain relative position.

Referring again to the Cessna 182; it can be slowed as low as 60 mph with 20 degrees of flap (second notch) and a power setting of 14 inches of manifold pressure and 1,900 rpm. Attitude of the airplane at this configuration is slightly nose down, and there is good response from both rudder and aileron. At 80 mph, with 10 degrees of flap (first notch) position and a power setting of 15½ inches of manifold pressure and 2,250 rpm, the nose position of the airplane is normal. To slow the Cessna 182 to 80 mph without flap necessitates flying with the nose above the normal attitude.

Another condition in which high performance flaps are of great value is where imperative need exists to get on the ground in a hurry, or to quickly sluff off a lot of altitude. Here, with full flap and no power, the 182 can let down better than 1,500 fpm at a speed of not over 80 mph; landing is possible from 4,000 feet in less than three minutes.

Normal landing techniques with flap vary but, in general, most experienced pilots observe the following procedure: On final approach, at about the time landing gear normally would be lowered, the aircraft is slowed to within the speed range of flaps and the one to two notches, 10 degrees to 20 degrees applied. This is held until "over the fence." In calm air and on hard surface runways the landing can be completed at this setting but, if on a sod or rough field, full flap is applied immediately upon crossing the boundary of the field so that the airplane may land as slowly as possible, sparing it rough treatment. Flaps should be left extended until the end of the landing roll under normal conditions. If with flaps fully extended, the wind is found to be exceptionally gusty at ground level, it may be well to retract the flaps immediately after contact to avoid ballooning.

When making a short field landing in calm air, a combination of a little power with full flaps offers the possibility of the slowest touchdown speed yet gives good control right to the ground. A normal glide angle can be set up by counteracting the drag of the full flap with the added power. With a no-power, full-flap approach, a fairly steep glide and a rather sweeping flareout is required, while with power the glide angle is shallower and no drastic change of pitch position is required for landing. The sweeping flareout is a natural outcome of the ability to dive with full flap and no power, yet not reach speeds above 80 mph. So, if a no-power approach is used, and the descent is from enough altitude to permit full flap, a very steep glide can be aimed at the point of flareout and touchdown made several hundred feet beyond. This steep approach is necessary

(Continued on page 88)

You can have this
ILLUSTRATED
FREE BOOK
32 page

Shows You — Tells You about the wonderful career opportunities in the world's *fastest growing interdependent industries:*

• AERONAUTICS
• ELECTRONICS

Tells how you can take your place in a surprisingly short time, at Big Pay and with a Future Unlimited, alongside the hundreds of successful Northrop graduates. They are employed by many of the country's leading companies on such projects as:

Electronic Computer Planning,
Missile Flight Test Engineering,
Design of Servomechanisms,
Design of Rocket Powerplants,
Celestial Guidance Systems,
and many more.

It will cost you nothing but a postage stamp to find out about the wonderful future open to you, and about the great demand for Northrop Institute graduates.

APPROVED FOR VETERANS

MAIL THE COUPON TODAY!

Northrop
Aeronautical Institute
An Accredited Technical Institute
1119 W. Arbor Vitae Street
Inglewood 1, California

NORTHROP AERONAUTICAL INSTITUTE
1119 W. Arbor Vitae Street, Inglewood 1, Calif.
Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:
☐ Aeronautical Engineering Technology
☐ Electronic Engineering Technology
☐ Aircraft Maintenance Engineering Technology
☐ Master Aircraft and Engine Mechanic
☐ Jet Engine Overhaul and Maintenance
Name . . . . . Age . . .
Address . . . . . .
City . . . . . Zone . . State . . . .
Veterans: Check here ☐ for Special Veteran Training Information.

$100,000.00 ACCIDENT INSURANCE

FOR PILOTS AND AIRCRAFT PERSONNEL

Pays up to $100,000.00 for any accident resulting in death or loss of any ONE hand, eye or foot.

CONSIDERABLE SAVINGS OVER OTHER ACCIDENT POLICIES. 24 HOUR PROTECTION IN THE AIR, AT HOME, ON THE ROAD, AT WORK, AROUND THE WORLD.

RATES TO AGE 55*

AMOUNT	NON-PILOTS	PRIVATE PILOTS	COMMERCIAL PILOTS & CREW MEMBERS	MILITARY PILOTS & CREW MEMBERS
$100,000	$150.00	$525.00	$600.00	$675.00
50,000	75.00	262.50	300.00	337.50
25,000	37.50	131.25	150.00	168.75
15,000	22.50	78.75	90.00	101.25
10,000	.....	52.50	60.00	67.50

RATES FOR 56-80 UPON REQUEST — *MAIL COUPON NOW!

PROFESSIONAL ASSOCIATES, ADMINISTRATORS
PILOTS & AIRCRAFT PERSONNEL ACCIDENT INS.
SUITE 856, 120 SOUTH LA SALLE STREET, CHICAGO 3, ILLINOIS

Please rush full information and application to:

NAME .....

ADDRESS .....

CITY & STATE .....

REPOSSESSIONS

SAVE ON COMMANDERS, 310's BEECHES, ETC.

Good Buys, or you just assume payments

AIRCRAFT FINANCE, INC.

Phone EM 6-5509 Box 5306
Denver 17, Colo.

★ THE DIRTY BIRDS ★

Prevent roosting by treating areas once a year with a Bird Repellent Aerosol Bomb, or economical Cartridges, for use in any 10 inch caulking gun. Postpaid $5.00 each. Money back guarantee.—Distributor:

F. C. PARLETT
EDGEWATER, MARYLAND

AIRCRAFT FINANCING

¼ Down—Up To 36 Months
on Approved Credit
We Will Finance Your Purchase
From Any Dealer or Individual

AIR-CREDIT SALES CO.
Torrance Municipal Airport
Torrance, California DA 6-8970

Cap'n Sharp says:

"ALWAYS TAKE MY MANUAL!"

Experienced pilots won't go anywhere without Jeppesen's Airway Manual ("Jepp Manual" to the old pros).

- **The only *complete* IFR flight manual • Revised weekly**
- **12 different geographic coverages**

Charts: Planning, Jepco avigation (enroute), terminal area, high-density area, instrument approach, center frequency, weather radar, and many others.

Flight Info: Preferential routes, cross-indexed CAA facilities, GCA and DF facilities, OMNI check points, Airway Traffic Control rules, CAR's 42, 43 and 60, Air Safety Bulletins, and many other features.

See your Jeppesen dealer, or write for folder 1L.

Jeppesen & co. / STAPLETON AIRFIELD, DENVER 7, COLORADO

(Continued from page 87)

to maintain sufficient speed for good control right to the ground. If a flareout is started too early, speeds are dissipated quickly and there is danger of building up rapid vertical descent too far off the ground. In calm air it is best to take a 182 plumb down to the runway at a speed of about 70 mph and flareout only a few feet above the ground.

In very rough air, most pilots stick to all flap or no flap. Partial flap is a high-lift position and gusts will have much more effect, bringing about considerable work with the ailerons. Also in cross-wind landings, it is generally all or no flaps—full flap, if using a short runway and rough field; no flap, if very gusty and plenty of room. Should a go-around be necessary, and full flap be extended, care must be exercised when retracting. To pul up flaps quickly may be asking for trouble since the aircraft's stalling speed is higher without flaps. Sound procedure is to retract them gradually, a notch at a time after power has been applied and the aircraft is accelerating.

One other situation to consider is an actual forced landing. When engine power is no longer available, don't give away altitude by scurrying for the ground. The problem is to get the best glide to a suitable field. When one definitely is within reach, and the airplane has been positioned into the wind for the approach, flaps can be used sparingly. Only when "over the fence," or at least sure of getting over the fence, is full flap extended to effect a slower landing. Even if immediately over an ideal landing place when an engine failure occurs, it is best to glide with no flap, as a circle is made to look carefully for ditches or obstructions. Then, after the altitude has been consumed by normal glide, the aircraft can be positioned for the approach and flap used as needed.

Remember, once flaps are fully extended and an approach set up, the point where the aircraft is aimed is about where the flareout will be made and, just beyond that point, the plane is committed to land.

With proper use of flaps both safety and performance can be increased. But this means a pilot must thoroughly familiarize himself with the flap characteristics of his particular type of aircraft. Flaps are not foolproof. END

QUIZ

Three-letter abbreviations are used daily in aviation talk. Test yourself. If you miss three or less, you are pretty sharp; four to six, you are good; seven or more, you need to brush up. Definitions on page 93.

ADF	ETE	LMM
APC	GCA	LFR
ASR	IFR	PAR
ATC	ILS	VFR
DME	KTS	VHF
ETA	LFM	VOR

WHERE SPACE BEGINS

ALTHOUGH earth's atmosphere extends hundreds of miles above the surface of the globe, physiologically, "space" for living beings, begins considerably lower—below 50 miles, to be exact. Any altitude above this can be considered as "space" as far as human organism is concerned. For example:

- Beyond 15 miles (74,200 feet) life is not possible without artificial pressurization.
- 20 miles (105,600 feet) is the borderline of safe absorption of cosmic ray radiation.
- 25 to 30 miles (127,000 to 158,400 feet), ultraviolet portion of solar spectrum equal to that in interplanetary space.
- 65 miles (338,200 feet), zone of meteors begins. Meteors burn up below this altitude.
- 75 miles (382,000 feet), all propagation of sound stops.

U. S. AIR FORCE K-2B FLYING SUITS

REGULATION SAGE GREEN **$18.50**

PLEASE STATE HEIGHT, WEIGHT CHEST SIZE

COMPLETE WITH OXYGEN TAB, MAP CLIP, LEATHER NAME PLATE, CIGARETTE-PENCIL POCKETS, ZIPPERED BREAST, THIGH AND LEG POCKETS, DOUBLE LOCK FRONT ZIPPER

INTERNATIONAL SURVIVAL ORANGE **$21.50**

All Orders Postpaid If Remittance Accompanies Order—Or C.O.D.

FRUHAUF SOUTHWEST UNIFORM CO.

DEPT. F 312 E. ENGLISH ST. WICHITA 2, KANSAS

PEA

pilots employment associates

Teterboro Airport

Teterboro 1, New Jersey

Service & Maintenance

Flight Instruction

80 - 91 - 100 Octane

• Unicom • Rotating Beacon

• Hard Surface Runway

• Lights on Request

• Snack Bar • Hertz-Rent-A-Car

• Charter Service

Midway between Washington and Richmond

— Out of congested area —

SHANNON AIRPORT

P. O. Box 354, Fredricksburg, Va.

Phone Essex 3-4431

PILOTS — **INCREASE YOUR EARNING POWER**

Get Your INSTRUMENT and AIRLINE TRANSPORT RATING *NOW*

INSTRUMENT An Instrument Rating is a MUST for all AIRLINE co-pilots, business pilots and for any one making extended cross country flights.

COMMERCIAL PILOTS COURSE Present tremendous demand for airline pilots has depleted supply of qualified commercial pilots — if you want to fly for a living get your Commercial NOW.

AIRLINE TRANSPORT Necessary for all airline captains — most private companies now require it for all their pilots. Single engine and multi-engine Lockheed, Aero Commander, Douglas DC-3's available.

TYPE RATING Available to those already holding ATR's who want a Type Rating added to their license. Lockheed, Aero Commander and Douglas DC-3's available.

COMPANY PILOT REFRESHER Single engine and Multi-engine Lockheed, Aero Commander and Douglas DC-3 aircraft available for this Course, which is tailor made for each company pilot.

MULTI-ENGINE Lockheed, Aero Commander and Douglas DC-3's available for this course.

INSTRUCTOR Tremendous demand for pilots holding Instructor Ratings.

A Complete Ground School Furnished With All Courses.

Train at American Flyers — the world's largest Instrument and Airline Transport Flying School — and insure your future in aviation. American Flyers has trained more pilots for the airlines than any other school in the country — MORE THAN ALL OTHER SCHOOLS COMBINED!

VETERANS — All you need to enroll in any of these courses is a Certificate of Eligibility from the Veterans Administration approving you for the courses you desire. Courses start every Monday morning — no waiting.

"THE AIRLINE PILOTS TRAINING SCHOOL"

AMERICAN FLYERS INCORPORATED

MEACHAM FIELD • FORT WORTH 6, TEXAS

MAIL THIS COUPON TODAY

☐ INSTRUMENT
☐ AIRLINE TRANSPORT
☐ COMMERCIAL
☐ TYPE RATING
☐ COMPANY PILOT
☐ MULTI-ENGINE
☐ INSTRUCTOR

☐ VETERAN ☐ CIVILIAN

REED PIGMAN, AMERICAN FLYERS, Meacham Field, Fort Worth 6, Texas

Please send me FREE Booklet and data on courses checked —

NAME_____

STREET_____

CITY_____ STATE_____

WE BUY TWINS

CASH NOT CONVERSATION

THERE IS A DIFFERENCE!

One or complete dealer stocks, new or used. We'll buy over the phone. No Red Tape. We pick up. Send for our free list of airplanes for sale.

VEST AIRCRAFT CO.

Box 5306

EM 6-2663 Denver 17, Colo.

I Learned About Flying from That!

(Continued from page 56)

flashlight. The light was in the rear seat with the other pilot. I momentarily unfastened my oxygen mask and yelled to him to check the standby compass, but couldn't make myself understood. I decided that since the slave gyro had been working well previously, it would probably still be functioning normally.

I glued my eyes to the gyro needle. Fuel was low but I calculated I was only five minutes out. There didn't seem to be any great problem.

I had been waiting for the moon to help me see my instruments. Now I saw its unmistakable glow on the horizon. But it was rising in the north this particular evening! The slave gyro had been treacherously leading me south a degree at a time until now I was 90 degrees off course. I had heard of this happening to others and it had always struck me as inexcusable. Now I had no idea where I was. And didn't have enough fuel to waste any time.

If I had had radio contact I would, of course, have remained at altitude to conserve fuel and waited for an emergency steer. But at 39,000 I had no radio contact of any sort, and no idea if our transmissions had been heard. In the next few minutes I either had to find some place to land or get out and walk. I tightened my shoe laces and parachute straps and started down.

We broke out underneath at 17,000—over the Gulf of Mexico! No Mae West. No life raft. Not even an idea of which direction to start swimming.

Suddenly there was a faint and garbled noise in my earphones. What a marvelous, comforting sound!

"Air Force Jet 14466. If you read, steer 030 degrees."

It was difficult to believe that I had to fly north to get back to dry land. But I had to believe somebody. If they said 030 then 030 it was. I now had the flashlight and followed the shaky compass as closely as I could.

Finally I saw the lights of Mobile up ahead. There was nothing to do but coast down and hope to make it. As I descended, the radio began to respond. There was an airport on each side of town but I couldn't remember which one was which.

Then at 5,000 feet Brookley Tower came in loud and clear.

"Air Force Jet 14466, you are cleared for an immediate landing. We are switching runway lights for positive identification."

With that the runway lights of the strip directly beneath me were switched. It didn't look very long for an 8,000 foot runway, but I wasn't in the mood to be asking any more questions. It was a runway. They had switched the lights. That was enough. I advised the tower that I had no lights and would call on initial.

The tower assured me that the ambulance and crash trucks were standing by. When they expressed concern as to whether or not I was going to make it, a studiously detached voice from the rear seat issued a reassuring "No sweat,

60

NEW PROJECTS FOR "DO-IT-YOURSELFERS"

in the NEW EDITION of the

ELECTRONIC EXPERIMENTER'S HANDBOOK

IMPORTANT NEWS: The new *1958 Edition* of the *Electronic Experimenter's Handbook* is now on sale. If you like to build useful, profitable electronic devices, pick up a copy of the *new* Handbook *now*.

60 Devices . . . Nearly 200 pages . . . a Practical "File" of Electronics Ideas and Information

FOR YOUR HI-FI. Presence control. Hi-fi crossover. Filter. Electrostatic speaker system. Mixer equalizer. Spare amplifier. $5 coax. 3-way speaker system. Junior hi-fi. Crossover with brilliance.

RECEIVERS. Shirt pocket transistor superhet. Vokar receiver. Superegen unit. Miniature VHF ear. Junkbox BC receiver. Etched circuit two-tuber.

FOR YOUR HOME. Invisible light door opener. Electronic brain to control house lights. DC supply for AC/DC motors. Power transistor for pocket radios. Light-operated relay. Transistorized intercom. Radio intercom. Electronic Christmas bells.

FOR YOUR DARKROOM. Audio photometer. Transistor slave flash unit. "Varistrobe." Light distributor. Darkroom timer. Enlarger exposure meter.

FOR YOUR HAM SHACK. Simple shortwave receiver. VHF explorer's receiver. 70-watt transmitter. Double your Heathkit AT-1 output. Code practice set. Antenna tuner. Transistor 10-meter receiver.

FOR YOUR WORKSHOP. Economy tube tester. Heat-controlled solder stand. Economy signal generator. Simple oscilloscope calibrator. $14 signal tracer. Transistor checker. Capaci meter. Low-cost multi-tester. Transistorized signal tracer.

FOR THE KIDS. IQ tester. Electronic worm digger. Model spaceship. Game computer. Transistorized phonograph amplifier.

SPECIAL PROJECTS. Solar battery experiments. Electronic anemometer. Picture tube rejuvenator. Detectorscope. Simplified etched circuits. Geiger gun. Frost sentinel. Vibrato for an electric guitar.

NOW ON SALE

Only $1

Pick up your copy today at your newsstand or radio parts store

ZIFF-DAVIS PUBLISHING CO., 64 East Lake St., Chicago 1, Ill.

Brookley Tower." That was the last transmission Brookley received from Air Force Jet 14466 until a collect telephone call some 25 minutes later.

Since I knew I had 8,000 feet of runway plus overruns, I purposely landed a bit long in case I flamed out on final. It was a marvelous feeling to have my wheels on the runway but, as I watched the blue lights on the far end, it became apparent that I was rolling down a strip considerably shorter than 8,000 feet. I dribbled off the far end, settled into six inches of mud, and cut all the switches.

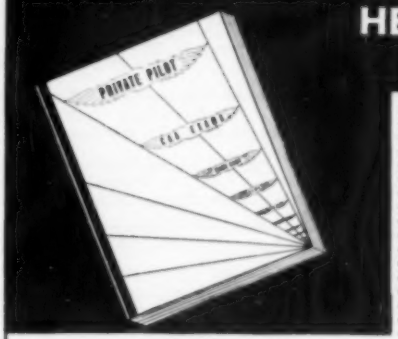
A few seconds later I was walking shakily around the airplane looking blankly at what I had expected would be Base Operations. A Constellation was unloading passengers. We had landed at Bates Field! I looked at the other pilot. We were both painfully aware of the last transmission Brookley had received from us. "No sweat, Brookley Tower."

Why the runway lights at Bates Field were switched at the same time Brookley said they were switching theirs I never found out. However, the general causes of my predicament are quite plain. I had become over confident and complacent. I had begun to push my luck.

Some people can learn from other's mistakes. Unfortunately, a few of us have to find out for ourselves. My attitude and flying practices have undergone a considerable change since that evening over the Gulf. END

CAA EXAM AIDS

LATEST QUESTION & ANSWER BOOKS HELP YOU PASS THE NEW CAA EXAMS



EXAMS

These books contain copies of the latest CAA question & answer aids. They include all charts, diagrams and a refund slip. Save time, money & effort. Try them at our risk. Mail the coupon today.

ANSWER EXPLANATIONS

This book explains in simple steps how each answer in the exam book is obtained. It explains all calculations, navigation, computer, weather, CAR etc. This explanation book is used with the exam book.

CAA CHECK FLIGHTS

This book clearly explains how to pass the latest type CAA check ride. It has the latest maneuvers, requirements, oral test, diagrams, short cuts etc. Save expensive flight time and mail coupon today.

A & E PRACTICAL

This book clearly explains how to pass both mechanic practical tests. It includes oral exam, weight & balance, short cuts, demonstration jobs and a refund slip. Try it at our risk and mail coupon today.

HOME STUDY NAVIGATION

This book clearly explains step by step every basic type navigation problem. E6B computer, ADF, OMNI, ILS, charts, etc. It makes navigation problems simple and easy to understand. Order your book today.

( ) Commercial Pilot Exams
( ) Commercial Exams Explanation Book
( ) Commercial Check Flight
( ) Private Pilot Exams
( ) Private Exams Explanation Book
( ) Private Pilot Check Flight
( ) Instrument Pilot Exams
( ) Instrument Exams Explanation Book
( ) Instrument Check Flight
( ) Powerplant Mechanic Exams
( ) Airframe Mechanic Exams
( ) A & E Mechanic Practical
( ) Home Study Navigation Book
( ) Flight Instructor Exams
( ) Flight Instructor Check Flight
( ) Airline Transport Rating Exams
( ) A T R Exams Explanation Book
( ) A T R Check Flight
( ) Flight Engineer Exams
( ) Fundamentals of Ground Instruction Exams
( ) Link Instructor Exams
( ) Navigation Instructor Exams
( ) Radio Navigation Instructor Exams
( ) C.A.R. Instructor Exams
( ) Meteorology Instructor Exams
( ) Aircraft Instructor Exams
( ) Engine Instructor Exams
( ) Helicopter Flt. Instructor Exams
( ) Traffic Control Operator Exams
( ) Dispatcher Exams
( ) Parachute Rigger Exams

ANY 4 $10.00 ANY 2 $8.00
ANY 3 9.00 ANY 1 5.00

ACME SCHOOL OF AERONAUTICS

TERMINAL BUILDING
MEACHEM AIRPORT Phone
FORT WORTH, TEXAS MA 6-2444

☐ Payment enclosed ☐ Send COD
Please mail the items I checked above.

Name_____

Address_____

City, State_____

BLIND FLYING KIT

Learn instrument flying safely and quickly by using this kit in your airplane. This kit meets Army-Navy specifications EL50303 and is approved for CAA check flights. Kit contains the new precision design optical orange panels, blue lens goggles and the famous A.S.A. book on instrument flying. Panels are attached in a few seconds to windshield and windows with special suction cups. With goggles on, you can see everything inside but not outside. Kit is light, easily stored and durable. Goggles are light, comfortable, non fogging and can be worn over eyeglasses. Price is only $49.50 and can be shipped immediately direct from manufacturer. Check off your type airplane and mail in coupon today. Be safe by being prepared.

☐ Bonanza
☐ Cessna 180 182
☐ Tri Pacer
☐ Cessna 120 140
☐ Cessna 170 172
☐ Apache
☐ Cessna 310
☐ Navion
☐ Aero Commander
☐ Cessna 190 195
☐ Beech D18
☐ Stinson
☐ Swift
☐ Luscombe
☐ Super Cub
Others not listed

AIR RESEARCH INSTITUTE
MUNICIPAL AIRPORT
FORT WORTH, TEXAS

☐ Payment enclosed ☐ Send COD
Please send kit checked at left

Name_____

Address_____

City and State_____

HOW DO YOU KNOW

that you are getting the BEST for your money?

you can always BE SURE when you

Buy a BRAND NAME PRODUCT!

Airtex Products

Supplies only the BEST for your aircraft interior and exterior equipment and finishes!

Randolph AIRCRAFT FINISHES · Flightex Fabrics · Versol · 3M · Aerolyn Fabrics · Cartex Foam Rubber · Talon Fastners · Burlington · Thermoid · Airtex

BRAND NAMES YOU CAN BUY WITH CONFIDENCE!

ORDER BY MAIL

AIRTEX HEADLINERS
SIDE WALL PANEL SETS
CUSHION SETS
Carpets - Curtains - Covers
GRADE A FLIGHTEX or IRISH LINEN
RECOVER ENVELOPES
Complete line of FLIGHTEX and PANDOLPH FINISHES and RECOVERING SUPPLIES

Write for FREE CATALOG

We pay shipping charges on paid orders

Airtex Products
20-22 Union Street Morrisville, Penna.
CYpress 5-3462

FLYING CALENDAR

March 29-April 2—Fly in to San Francisco Int'l Airport for the 12th annual Grand National Jr. Livestock Exposition at the Cow Palace, San Francisco.

March 30-April 1—RFC-RNAS Reunion (WWI), Toronto, Canada. Contact: C. B. Stenning, Ch., 149 South Dr., Toronto 5.

April 10-20—Fly in to San Bernardino Airport, San Bernardino, Calif. for 43rd Annual National Orange Show.

April 13—Fly in to Oakdale Airport, Oakdale, Calif., for the Oakdale Rodeo at the Livestock Grounds.

April 14-16—FAI Congress convening at Institute of Aeronautical Sciences, Los Angeles, Calif.

April 16-19—American Helicopter Society 14th Annual National Forum, Sheraton Park Hotel, Washington, D. C.

April 19-20—Fly in to Bidwell Field, Red Bluff, Calif., for the 36th annual Red Bluff Roundup.

April 24-27—Phoenix Spring Cruise of Flying Physicians Assoc., Inc. at Valley Ho Hotel, Scottsdale, Ariz. Flight to Grand Canyon, western party, golf, swimming. Contact: L. D. Beck, M.D., Chairman, 1626 No. Central Ave., Phoenix, Ariz.

April 30-May 4—Fly to Los Banos Airport, Los Banos, Calif., for Merced County Spring Fair and Livestock Show.

May 1-3—Washington State Apple Blossom Festival at Wenatchee, Wash. Fly-in breakfast and parade May 3. Transportation furnished from Fancher Field and Pangborn Field for parade.

May 4—Sportsman Pilot's Proficiency Flight No. 10 (a handicap air race) open to all pilots at Reid's Hillview Airport, San Jose, Calif. Final entry date, 26 April. Contact: Thomas C. Buck, 13106 Galway St., Garden Grove, Calif.

May 4-7—American Assoc. of Airport Executives 31st annual business meeting and convention, Hacienda Motel, Fresno, Calif.

May 8-10—National Intercollegiate Flying Meet at Macalester College, St. Paul, Minn.

May 10-14—Sixteenth Annual Miami-Havana Air Cruise sponsored by Florida Air Pilots' Assoc. includes celebration of Cuban Aviation Day, May 10th. Contact: James G. Pace, Cruise Director, 310 SE 2d Ave., Miami, Fla.

May 16—Air Mail Pioneers Anniversary Ball, Beverly Hilton Hotel, Beverly Hills, Calif.

May 17—Armed Forces Day. All commands of Army, Navy, Air Force, Marine Corps, Coast Guard, National Guard, Reserve Forces and Civil Air Patrol will hold "open house."

May 17-18—Aviation program Week May 12-18 sponsored by Klamath Falls Ch., Oregon Sprots 'em Pilots, Kingsley Field, Klamath Falls, Ore. May 17, Aviation banquet; May 18, Fly-in Breakfast—Air Fair.

May 26-30—Aviation Writers Association annual convention, Shamrock Hotel, Houston, Tex.

May 28-June 6—Gulf Circle Air Tour Cruise sponsored by Florida Aero Club. Depart from Miami for Havana; Cozumel, Mexico; Merida; Veracruz; Mexico City; Brownsville; Houston and New Orleans. For details, write: Harry B. Collins, Air Cruise Dir., 375 NE 154th St., North Miami, Fla. Phone WI 7-2060.

June 1—Annual "C. R. Hoser Memorial" proficiency race sponsored by CAP Sq. 904. Open to all pilots. Write: Anthony O. Testone, PIO, CAP Sq. 904, 319 Oak Park Rd., Lansdale, Pa.

June 6-7—Ninth Annual Maintenance & Operations Meeting, Reading Aviation Service, Inc., Municipal Airport, Reading, Pa.

June 12—Seventh Annual Skylady Derby, efficiency air race for women pilots, 640 miles. Contact: Ruth Nickell, Nat'l Ch., 904 Nickell Rd., Topeka, Kan.

June 15—Try-outs for American Parachuting Team (Skydivers) at Vancouver, B. C.

June 24-26—Aviation Distributors and Manufacturers Assoc., 31st meeting. Mount Washington Hotel, Bretton Woods, N. H.

June 28-29—Eleventh Annual Moonlight Flight of Porterville Area Pilots Association. For details, contact: PAPA, 1110 Mill St., Porterville, Calif., or phone Sunset 4-3870.

July 4-6—All-American Aviation Exposition, County Airport, Pittsburgh, Penn., featuring "History of Flight," Antique Aircraft, Experimental (Homebuilt aircraft). For information, write: All-American Aviation Exposition, 210 Semple St., Pittsburgh, Penn.

July 4-8—Twelfth Annual All-Woman Air Race from Montgomery Field, San Diego, Calif., to Municipal Airport, Charleston, S. C. For information, write: AWTAR headquarters, 2611 East Spring St., Long Beach 6, Calif.

July 16-22—Jaycee Air Cruise, Philadelphia to Mexico City, Mexico. Single and twin aircraft owners and families invited. Participants aircraft fee, $30. Contact: Marc Saunders, Air Cruise Ch., Jr. Ch. of Comm. of Phila., 121 South Broad St., Philadelphia, Pa.

July 29-Aug. 7—Twenty-fifth National Soaring Contest at Bishop, Calif., sponsored by Soaring Society of America. Contact: Lloyd M. Licher, P. O. Box 66071, Los Angeles 66, Calif.

August 8-10—Sixth Annual Experimental Aircraft Fly-in and Sport Aviation Meet. Curtiss Wright Airport, Milwaukee, Wis. Everyone welcome. Write: Paul Poberezny, EAA, Hales Corners, Wis.

Aug. 30-Sept. 1—Kentucky Air Tour. For full details, contact: Frank L. Savage, Exec. Vice Pres., Kentucky Jr. Ch. of Commerce, 670 South Third St., Louisville, Ky.

Calendar items must be received at FLYING's editorial offices, 1 Park Avenue, New York 16, N. Y., three months prior to the event.

QUIZ ANSWERS

(See Page 88)

ADF Automatic Direction Finder
APC Approach Control
ASR Air Surveillance Radar
ATC Air Traffic Control
DME Distance Measuring Equipment
ETA Estimated Time of Arrival
ETE Estimated Time Enroute
GCA Ground Controlled Approach
IFR Instrument Flight Rules
ILS Instrument Landing System
KTS Knots
LFM Low Powered Fan Marker
LMM Compass Locator at Middle Marker
LFR Low Frequency Range Station
PAR Precision Approach Radar
VFR Visual Flight Rules
VHF Very High Frequency
VOR Very High Freq. Omni Range Station

COMPLETE SERVICES for BUSINESS AIRCRAFT

- Beechcraft sales & service
- Rental & Leasing
- Complete line radio & electronics

30th YEAR

Atlantic Aviation CORPORATION

- Used aircraft sales
- Complete maintenance Cubs to DC-3's
- Parts, including DC-3, Ladestar, etc.

FROM MAINE TO VIRGINIA . . . A SHORT HOP TO ATLANTIC

Logan Airport	New Castle County	Teterboro	Philadelphia	Preston Glenn
Boston, Mass.	Airport, Del.	Airport, N. J.	Int'nl. Airport	Airport, Va.
Logan 7-8700	*East 8-6611*	*Atlas 8-1740*	*Saratoga 9-7500*	*Lynchburg 3-3134*

MEN WANTED!

Can YOU Qualify?

Ask yourself! If you were standing at this desk could YOU qualify? Do you have the necessary CAA licenses to take advantage of the thousands of aviation jobs now available?

To help you prepare yourself for these opportunities, Ross Aero Publishers have compiled Aeronautical Questionnaires, typical of the current CAA exams, to help you obtain the various CAA ratings or licenses needed to pave the way for an important position in aviation.

STUDY FOR CAA EXAMS AT HOME

CUT OUT AND MAIL

☐ PAYMENT ENCLOSED, SHIP POSTPAID ☐ SHIP C.O.D.

- ☐ Private Pilot $3.00
- ☐ Commercial Pilot $5.00
- ☐ Instrument Pilot $5.00
- ☐ Airline Trans. Pilot $5.00
- ☐ Flight Instructors $5.00
- ☐ Engine Mechanic $5.00
- ☐ Aircraft Mechanic $5.00
- ☐ Flight Engineering $5.00
- ☐ Ground Instructor $5.00
- ☐ Control Tower Op. $5.00
- ☐ C.A.R. for Pilots . $ .50
- ☐ Parachute Rigger $5.00

NAME_____

YOUR HOURS LOGGED_____

STREET_____

CITY_____ STATE_____

NOTICE

Would you like a complete Ross Aviation Library, consisting of all 12 Ross Aeronautical Questionnaires shown here? If so, we offer the complete set at a special price of —

$15 For the price of three you can get all 12 books.

☐ Check here for this 12 book special offer.

ROSS AERO PUBLISHERS
BOX 7071-F • MUNICIPAL AIRPORT • TULSA, OKLAHOMA

CAA RATINGS IN A HURRY!

Big Paying Jobs now open for You!

TRAIN IN FULLY AUTOMATIC LINK TRAINERS

Attend a school where personalized instruction allows you to get your CAA ratings immediately.

Look at what Ross Aviation offers you:

- The largest flight school in the U. S.
- Centrally located, good weather all year.
- Free placement service.
- Largest supplier of pilots to the nations airlines.
- Only flight school in U. S. using fully automatic link trainers.
- Ground school and Flight school.
- Operates seven days a week.
- CAA examiners on staff.
- VA and CAA approved.
- Courses start every Monday, no waiting.

CAA EXAMINERS ON STAFF

ROSS SCHOOL OF AVIATION
TULSA, OKLAHOMA

OVER 700 STUDENTS TRAINED IN LAST 14 MONTHS

MAIL TODAY!

ROSS SCHOOL OF AVIATION
Box 7071-M Municipal Airport, Tulsa, Oklahoma

You bet I'm interested. Without obligation, please send me information on the courses checked below:

- ☐ Instrument
- ☐ Airline Transport
- ☐ Multi-Engine
- ☐ Flight Engineer
- ☐ Commercial
- ☐ Flight Instructor
- ☐ Link Instructor
- ☐ A & E Mechanic

Name_____ Age_____

Your hours logged_____

City_____ Zone____ State_____

"AROUND THE WORLD FOR 30 YEARS"

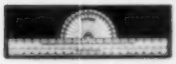
WEEMS

AIR NAVIGATION AIDS & INSTRUMENTS

Today's trusted standard for pilots and navigators everywhere

For accurate navigation, you need instruments you can absolutely rely upon. So select from the world-famous Weems line . . . where you'll find many instruments which are standard equipment with U.S. Air Force and Navy, as well as with major airlines, business and private pilots.

Always Ask for these Two Famous Reliables



WEEMS MARK II PLOTTER—To pilots the world over, the word "plotter" means Weems. Mark II is made of clear, laminated vinylite. Used for plotting courses, bearings and lines of position, measuring distances and constructing wind diagrams. Distance scales measure statute miles on Sectional (1:500,000) Charts and World Aeronautical (1:1,000,000) Charts. Only $2.00. *Also the Mark II-N,* for nautical mile navigators, *$2.50; the Mark II-NAF, for jet charts, $3.00.*

DALTON E-6B COMPUTER *(Plastic)*—Standard for years in U.S. and many foreign air forces and most commercial airlines. Two sides—one solves all wind drift, interception, alternate airport and other vector problems. Other side solves speed-time-distance, fuel consumption, altitude and air speed corrections, distance conversions and general computations. Speeds 30 to 400 m.p.h. or knots. $10, case included. *Also available is high speed Dalton E-10 at $12.50 in plastic ($25 metal) and new, automatic E-10A at $25.*

FREE 26 page catalog describes these and many other products in the complete Weems line, including facts about home study navigation courses offered by Weems School of Navigation, est. 1927. Either see your Aviation Supply Dealer or write us direct. Address Dept. 3 Weems System of Navigation, Annapolis, Maryland.

WEEMS *Trusted Name in Air Navigation*

AIRCRAFT INDUSTRY
NEEDS SPECIALISTS!

YOU can develop skill and know-how . . . specialize in aircraft maintenance, aircraft design, stress analysis!

Aeronautical University has had more than 25 years' experience in training personnel for the aircraft industry. Graduates in demand. Study AERONAUTICAL ENGINEERING TECHNOLOGY • ENGINEERING • DRAFTING • AIRPLANE AND ENGINE MECHANICS. Get your C.A.A. license in a few months, degree in 24 months. Outstanding faculty and equipment. G.I. approved. Part-time employment available. Free placement service. Founded by Curtiss-Wright. Write for information and "Opportunities in Aviation."

AERONAUTICAL UNIVERSITY
AT CHICAGO MIDWAY AIRPORT
5136 West 63rd Street, Chicago 38, Illinois

Hangar Flying

(Continued from page 16)

doing some fancy steps as I taxied toward the parking ramp.

I could sense an air of excitement, and saw rather than heard the shout that came from the gay crowd as I swung around into parking position. Before I could shut off my engine, the band started marching toward me and a welcoming committee headed by the Mayor himself proceeded toward my plane. Patrolling a million miles of line is a pretty big thing to an individual, but why should it mean so much to a city in which I had never lived . . . not willing to sell short the publicity director of the aircraft factory which gave birth to my Triple Nine, I shrugged off this amazing reception. As the Mayor drew nearer I saw that he was carrying the "key to the City," while one of the committeemen had some kind of a plaque in his hands. Not to be outdone by their holiday mood, I flung open the door and jumped out as gracefully as my 53 years would permit, and stood ready for the speech of welcome.

The Mayor was smiling as he held the City Key in his left hand, drawing to

within a few feet of me, I could see the words of welcome form on his lips, but only the sound of the band and noise of the charging crowd could be heard. I began to be concerned about the safety of my airplane, remembering how Lindbergh was forced to protect his "Spirit of St. Louis" from mob violence. However, I wanted to be as kind as the Nebraska crowd, so I smiled and extended my hand. The Mayor's eyes, though, did not meet mine, they seemed to focus on the N-999E on the wing of my white Super Cub as if to be sure that this was the right party.

It was then that my smile vanished and my face turned to a red brighter than the trim on my Triple Nine, for, as I followed his glance, I noticed that he was not looking at the numbers, but rather at a very famous DC-3 that had slipped in behind me and was bearing a load of prominent television stars with their Master of Ceremonies, arriving to take part in a "big broadcast" and statewide celebration.

As the band and excited crowd separated to pass me by, it seemed as if the wings bearing the N, the three nines and the E sagged a little in embarrassment.

LOREN CARLBERG

Enid, Okla.

Official **SEA, AIR & LAND PHOTOS**

CARRIERS, SHIPS — NEW JETS, ROCKETS
YOUR CHOICE OF THOUSANDS

SPECIAL INTRODUCTORY OFFER — Send 25c with your name and address and choose one set.

1. 4-3½x5 Carrier, Subs and Battleships
2. 4-3½x5 World War II planes
3. 4-3½x3 photos, world's fastest jets
4. 1-8x10 photo, Forrestal Carrier
5. 1-8x10 photo USN F11F-1 Tiger

OR All five sets for $1.00

Regular $2 Value

FREE With Order — Large illustrated Catalog . . "Thousands of Aircraft AND Navy Photos"

MAIL YOUR ORDER TODAY

U.S. SEA & AIR PHOTOS
Dept. 2, Box 75084, Los Angeles 5, California

THE **SKYMOTIVE** STORY

Complete **INSTRUMENT** SALES and SERVICE

kymotive

O'HARE FIELD CHICAGO

IFR HOOD

1st in Safety! 1st in Comfort!
1st in Pilot's Choice!

The modern method of simulated instrument flight for training and maintaining proficiency. $15.00 at your Airport or

FRANCIS AVIATION
Box 299 Lansing, Mich.

TIME STICK

New plotter measures check point to check point time or speed directly on sectional or WAC chart. Also measures distance and direction. Heavy laminated vinyl. Send $2.50 or order C.O.D. **TIME STICKS, Dept. B-2, Box 9185, Fort Worth, Texas.**

SURVIVAL KITS

ARE YOU GAMBLING

your life on the chance that a "forced landing" won't happen to you?

Others did—and lost!

If you are worth surviving carry a Survival Kit "C-2" to help. Write today for full particulars. Give license number.

SURVIVAL EQUIPMENT COMPANY
Division of Victor Tool Co.
DEPT. 615 OLEY, PENNA.

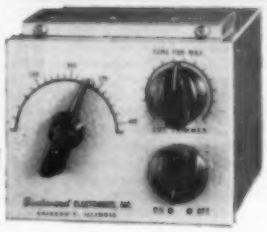
PHOTO CREDITS

8—LOCKHEED AIRCRAFT
10—DOUGLAS AIRCRAFT, GRAND CENTRAL ROCKET CO., KAMAN AIRCRAFT CORP.
24—JEAN RAEBURN
26, 27, 28, 29—U. S. NAVY
31—RODE PHOTO SERVICE
34—ULRIC MEISEL, TOM W. COLLINS STUDIOS
35—TOM C. DILLARD, ULRIC MEISEL
38, 39—WIDE WORLD PHOTOS
40, 41, 42, 43—COLLECTION OF GEORGE E. A. HALLETT
48—EMIL A. LEHECKA, HAROLD CURTIS
51—DEAN MCCARTY
52—BOAC
53—MARTIN, JOHN FLINN
54—LESLEY N. FORDEN
56—R. J. HOLLAND
72—BOEING AIRPLANE CO.
80—USAF
98—AIR ASSOCIATES, CONVAIR, BEECH AIRCRAFT, CONVAIR

THREE STRIKES AGAINST US

Three regrettable errors slipped into the review of Ruth Nichols' autobiography "Wings For Life" in our March book section, "Have You Read?" Miss Nichols first soloed in 1924, *not* 1927. When she was ditched in the North Atlantic, she was on a world flight on behalf of the U.S. Committee of UNICEF, *not* on an "overseas assignment for the U.N." Last, and most important, she did not *solo* the AF T-33 jet.

AVIATION WEATHER In Your Car



ORDER TODAY ONLY $44.95

Get your PREFLIGHT WEATHER BRIEFING on the way to the Airport. Our ENTIRELY NEW transistor operated Converter enables you to hear the regular Weather Sequences while riding in your car. NO INSTALLATION Problem; WORKS WITH ANY CAR RADIO regardless of whether 6 or 12 volt—Receives ALL L. F. AVIATION AND MARINE RANGE, BEACONS, AND TOWERS. Tunes full 200 to 400 K. C. ONLY TWO SIMPLE PLUG-IN CONNECTIONS.

$44.95

Boulevard Electronics is pleased to announce the appointment of the following Distributors.
General Aircraft Supply Corp., Detroit, Mich.
The Don Horn Co., Memphis, Tenn.
Sky-Store, Hawthorne, Cal.
General Aviation Supply Co., St. Louis-Oklahoma City-Houston-Phoenix.
Van Dusen Aircraft Supplies, Boston-Teterboro-Alexandria, Va.-Richmond, Va.-Miami-Chicago-Minneapolis

Dealers, contact your nearest Distributor or

Boulevard ELECTRONICS, INC.
1229 West Washington Boulevard — Chicago 7, Illinois

LATEST OFFICIAL AIRCRAFT PHOTOS

Rockets, Jets, Historical planes.
All makes, hundreds from which to choose.
SPECIAL INTRODUCTORY OFFER
with your name and address. Send only 25c . . . select one packet.

1. 4 3½x5 photos, world's fastest jets.
2. 4 3½x5 World War II planes.
3. 4 3½x5 of Rockets, Missiles.
4. 1 8x10 photo Boeing B-52 Jet Bomber.
5. 1 8x10 photo Lockheed F-104A Starfighter.

$2 VALUE FOR $1

All five packets for $1.00

Large illustrated catalog free with each order
MAIL YOUR ORDER NOW . . . TODAY
AVIATION PHOTO EXCHANGE
Dept. FF, Box 75084, Los Angeles 5, California

Fly a BENSEN COPTER

Send $1 or $2

Learn copter flying with your own BENSEN GYRO-GLIDER . . . simplest, most inexpensive craft of helicopter type. Easy to build. Order 3-view drawings, specs and photo for $1. Motor-powered Gyro-Copter drawings $2. Ask about plans and construction kits, also ready-to-fly craft.

BENSEN AIRCRAFT CORP., Dept. F-48
P. O. Box 2725 - Raleigh, N. C.
Name.....
Address.....

Classified Advertising

NOTICE: Rates, 40c per word. Minimum 10 words. May issue closes March 3rd. Send order and remittance to FLYING, 1 Park Ave., New York City 16

AIRPLANES FOR SALE

AERO COMMANDERS

WINTER Sale. Our 560 E Demonstrator. New June 1957, 120 Hours. Also 1955 560. Clean. Well Equipped. Commandair Inc. Westchester County Airport, White Plains, New York. White Plains 6-0473.

CESSNA

FOR Sale: 1 Cessna 180, 1954, serial 31102, CAA identification N 3604C. Hangared. Undamaged. 480 hours. Many Extras. One owner. All CAA conformitives. $9,000.00 Cash or Terms. Inquire William H. Gilliland Route 2 Alpena, Michigan.

PIPER

TRI-PACER: Super custom 1956 engine in 1953 aircraft. 650 hours. Gyros LF Dual VHF Omni. $4,000. Roger White, Haskell, New Jersey. TErhune 5-5333.

APACHE: Serial #178, Custom, 450 hours Total. Dual Generators. Excellent. Offer, Buswell, Airport, Lakeview, Oregon.

AIRPLANES WANTED

CORPORATION desires to buy or lease 1957 model Piper Apache, Cessna 180 or 182. Send full details to Box 116, Wayland, Massachusetts.

TRADE collection rare foreign rifles for all metal aircraft. Lee Harthan, Thornton, Iowa.

When you order by mail . . .

please print your name and address clearly, be specific in your order, enclose proper amount, allow ample time for delivery.

HELICOPTERS

HOMEBUILT Helicopter Handbook. Explanations; Components; Rotors; Airfoils; Design. $1.00. Homebuilt Helicopter Directory. Photographs; Specifications—Helicopters; Autogiros; Gliders. $1.00. San Urshan, Box 4332 N.P. Station, San Diego 4, California.

BUILD Flying Platform. Use Ford gears, Drone engine, Bolted construction. Three view drawings, Parts list: $2.00. Joe Shelby, Box 573F, Bellflower, California.

ROTOR Blades for Homebuilt Helicopters. Picture, Specs., Prices, 50¢. Adams, Box 6042-N, Lakewood, Calif.

PARTS & ACCESSORIES

OVER 200 fabric aircraft are now flying with Glasco-air . . . CAA approved fiberglass covers . . . guaranteed 50 years. Contact Glasco-air Products, Box 1232, Oxnard, California. See Display ad.

LARGEST stock in the U. S., of New, Used, and Overhauled engines, propellers, accessories and airframe parts. Free lists by makes. Univair, Dept. D, Box 5306, Denver, Colo.

PARACHUTES

NEW Surplus — Sky Diving — Personal. Used $27.50 up. CAA Guaranteed. Midwest Parachute, Novi, Michigan.

AVIATION EQUIPMENT

NEW "Mark VIII-C improved Dead Reckoning Computer with instructions, pocket size only $2.50"; New E-11 pocket size high speed, high Altitude Computer $5.00; New "Airlines Computer" (successor to American Airlines Computer), $9.00; "Batori Pilot's all metal Computer" $15.00; Pressure Pattern Drift, $2.50; Pressure Pattern Plotter, $3.00; New E-6B, $10.00; Warner Computer, $6.00; "Jeppeson R2 Computer," $6.70. Free Catalogue. Pan American Navigation Service, 12021-8 Ventura Blvd., N. Hollywood, Calif.

FREE catalog describing famous Weems navigation aids and instruments. Send today. Weems Mark II Plotter (statute miles) $2.00; Weems Mark II N Plotter (nautical miles) $2.50; Dalton E-6B Computer $10.00; new Mark VIII-C Computer $2.50; new Casey-Myers Computer $4.00; Link Bubble Sextant $37.50; many navigation books including new Weems Air Navigation $6.00; Flying the Omnirange, Zweng $4.00; Electronic Navigation, Orman $4.50; Star Chart, Illyne $1.00. Do as other navigators, pilots and students do. Select your navigation aids and instruments from the Weems Catalog. Send for it today. Address Department 12, Weems System of Navigation, Annapolis, Maryland.

LOG BOOKS

STEELE'S Pilot Log $1.50; Pilot Flight Record Log $1.00; Senior Pilot Log $5.70; Airline Pilot Log $5.70; Air Stewardess Log $2.00; Air Navigator Log $2.00; Flight Engineer Log (Deluxe) $5.70; Aircraft Log $1.50; Engine Log $.70; Pilot Progress Rating Log $1.00. (Free catalog.) Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

CHARTS AND MAPS

WORLD coverage of all current aeronautical maps and charts. Agents for Coast & Geodetic Survey, Hydrographic Office, Air Force. Free catalogue available. Pan American Navigation Service, 12021-8 Ventura Blvd., N. Hollywood, Calif.

AVIATION BOOKS

LIGHTPLANE plans, information, $4.75 postpaid. Brochure, dime. Wm. Fike, Box 683, Anchorage, Alaska.

RARE Aviation Books, Magazines, Pictures. Free Catalog. Write, Hampton Books, Hampton Bays, N. Y.

WARNING—CAA examination is being changed: It takes more than questionnaires to prepare you for the new "open-book" CAA examinations. You need the text and background material that only the authoritative, up-to-date Zweng Manuals provide. Used by aviation schools throughout the world. Fully illustrated, each manual averages more than 300 pages, with latest examination, too. There's a proven Zweng Manual for each rating: "Helicopter Rating" (new edition), $5.00; "Commercial & Private Pilot Ratings," both for $4.00; "Instrument Rating," $5.00; "Airline Transport Pilot," $5.50, "Flight Instructor," $5.00; "Flight Engineer," $5.00; "Aircraft Dispatcher," $5.00; "Safety after Solo" 1957 revision, $4.75; "Parachute Technician," $3.00; "Aircraft & Engine Mechanics," (including hydraulics, weight & balance) and new "Electrical Examination," $5.00; Meteorology for Airmen with examination (Zweng), $3.00; "Manual of the E-6B Computer," $3.00; "Rules of the Air," Indexed, illustrated, $2.00; "Ground Instructor, Basic," $2.75; and "Ground Instructor Rating, including examination," $4.00, prepares you; "Flying the Omnirange," $4.00; "Encyclopedic Aviation Dictionary," $6.00; "Electronic Navigation, radar and loran" (Orman), $4.50; "Air Navigation," 1955 Gold Medal Edition (Weems) prepares for Navigator Rating, $6.00. We supply any book by other publishers, including: "Jet Aircraft Power Systems," $6.50; "Radio Operator's License," $6.60; Practical "Air Navigation" (Lyon) $3.00; "Stick and Rudder" (Langewiesche), $5.50; "Crop Dusting" (6 manuals), $12.50; "Flight Manual for Aviation Cadets" (Hoyt), $2.00; (Free Catalog) Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

SCORE High on CAA air navigation examinations. Prepare quickly with genuine Cramwell navigation course, only $3.75, ppd. Be safe—fly safely. Cramwell Publishing Co., FM-7, Adams, Mass.

AVIATION Surplus Bargain Catalogue. One Dime Box 22 FM, Thomasville, Penna.

AVIATION books, old and new. Morgan, 3058 Newcastle, Dallas 20, Texas.

INSTRUCTION

OPERATORS, Instructors, Schools: prepare your students for the top—with Zweng Manuals. Complete Texts, latest typical examination. Free catalogue. Aeronautical and Marine discount sheet. Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

LEARN to Fly. Qualify for Flying Cadet. Officer Candidate or Specialist Training in armed forces technical schools. Get paid while learning. Prepare quickly for qualifying examinations. Guaranteed "Practice Tests' with answers: Flight Aptitude, $3.25; General Educational Aptitude, $3.25; College and High School Equivalence tests, $5.00. All three sets, $9.75, prepaid. Cramwell Books, FL-7, Adams, Mass.

HELICOPTER flight instruction courses beginning in April—Write now for details. Inland Airlines Box 644 Myrtle Beach, S. C. Complete charter, contract, instruction, and training services.

METAL CONVERSIONS

SICK with fabric headaches? Fed up with 100% depreciation? End all this with Skycraft Design's all-metal conversion. No screws, no rib stitching, no kits, no risk. You get flight-proven, durable Aluminum Alclad. Riveted rigid, strong, smooth, good-looking. CAA-STC approved. Hundreds of completed conversions. Want names of satisfied owners? They paid only $350 for Ercoupe wings (new thicker leading edge), 2-hr. exchange; Cessna 120-140 only $395, 5-hr. exchange; Stinson-108 wings, $595, fuselage $695, both $1195. All prices installed. Now's a good time. Skycraft Design, Old Star Airport, Langhorne, Penna. Windsor 5-7750.

PHOTOS

AVIATION Photo & Book Collectors! New lists of photos & books now available. Including Pioneer, WWI & II. Exclusive photos of Historical planes, latest Jets. Send 25¢ for sample photo & book lists. Airbooks, P.O. Box 958, New Rochelle, N. Y.

AIRPLANE photographs, beautiful large 14x17 color reproductions. Decorate dens, etc., with war planes in action. Six assorted. Send $1.00. Jarvis, Box 126 F, Bostonia, Calif.

PHOTOS OF Aircraft. 52-page catalog, 50¢. Lists nearly 6,000 photos from Wright biplane to latest jet. Old Aviation Books. 36-page catalog, 25¢. Over 15,000 in stock, including World War I. Aircraft Drawings In Color. W.W.I. And II Aircraft 11x8½, super-detailed. Send $1.00 bill for photo catalogue, book catalog, sample photos, and list of drawings. Aeroplane Photo Supply, Box 195, Toronto, Canada.

PATENTS

INVENTORS. Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 818-Victor Bldg., Washington 1, D. C.

BUSINESS OPPORTUNITIES

BUY Surplus aircraft; accessories; engines; instruments; electronics. Direct from U. S. Government. List and procedure $1.00. Aviation Surplus Center, Dept. 32, Etters, Penna.

AVIATION Operators: Many operators are increasing their income by stocking Zweng texts and general aviation supplies. Apply for a Dealership now. Pan American Navigation Service, 12021-8 Ventura Blvd., N. Hollywood, Calif. (Free Catalog.)

START your own aviation business with little capital. 47 opportunities. Details free. Christopher Publications, Holtsville 1, N. Y.

AVIATION Jobs—Names and Addresses Of Companies To Contact. $1.00. Fitzgerald (Chicago Division), Dept. A-1, 815 Countryside Drive, Wheaton, Illinois.

FOR SALE—Ozark fly-in resort, busy tourist traffic. On Lake. Excellent Investment. Box 545, Branson, Missouri.

SITUATION WANTED

AVIATION Personnel Available—Write To: Fitzgerald (Chicago Division), Dept. A-21, 815 Countryside Drive, Wheaton, Illns.

HELP WANTED

HIGH-PAYING Jobs Now Open! We will rush latest confidential reports on best employment opportunities (foreign, domestic, skilled, unskilled). Hundreds of aviation jobs now available! Also, jobs in electronics, construction, shipping, oil, and other lines. Application forms. Free registration. One-year advisory service. All for $2.50 ($2.85 Airmail). Unconditional Money-back Guarantee. Aviation Employment Information Service, Holtsville 7, New York. Six reports included Absolutely Free: (1) Pilot's Business Flying Directory; (2) Helicopter Opportunites; (3) Government Foreign Service; (4) Directory of Companies with Foreign Branches; (5) Alaskan Opportunities; (6) Directory of Airlines and Aircraft Manufacturers.

AVIATION Jobs—Names And Addresses of Companies To Contact. $1.00. Fitzgerald (Chicago division), Dept. A-13, 815 Countryside Drive, Wheaton, Illinois.

COPYRIGHTED Reports on best paying opportunities in foreign and domestic employment for skilled and unskilled. Aviation, construction, government, oil, shipping, laborers, office-work, trades, factory, supervisory, unusual jobs of many types. Special reports for pilots, engineers, mechanics, all aviation specialists with Airlines, Feederlines, Aircraft Factories, Cropdusters, Corporation Aircraft, etc. One year registration-advisory service. All for only $2.00 ($2.25 airmail.) (Reports sent C.O.D. on request.) Satisfaction guaranteed or double your money back. Our 12th successful year Act today for best paying jobs. Research Service, Suite 514-FI Meramec Building, St. Louis 5, Missouri.

CO-PILOTS Wanted — Airlines Hiring — Prepare For Co-Pilot Interviews, With New "Airline Co-Pilot Practice Exams"—$4.00. Contains Type Tests Given Co-Pilot Applicants By Airlines—Get: Aviation Job Opportunity Lists—$2.00. Flying Clubs Do Pay Off—$1.00. Esco Aviation, 1654 Idlewood Avenue, Akron 13, Ohio.

WANTED: Manager-operator, for new airport. Write giving full qualifications and references to Don Slape, Olney-Noble Airport Authority, Olney, Illinois.

AIRPLANES MISCELLANEOUS

$2.00 CAN save you hundreds. It's New! Now you can receive information each month on hundreds of aircraft for sale throughout the United States. At a glance you will know what is available, hours, date licensed, price, etc., of practically every type of airplane manufactured. We tell you who owns the aircraft and you deal direct, saving time, eliminating hours of travel, and by knowing the market you get the best deal possible. You can receive your first copy listing aircraft for sale immediately. Don't wait! Send $2.00 Today for a full year's subscription. Flyers' Market, published by Aircraft Listing Bureau, 5305 Congress Street, Chicago 16, Ill.

MISCELLANEOUS

GOVERNMENT Sells—Surplus Aircrafts; Fuselages; Assemblies; Accessories; Engines; Instruments; Electronics; Boats; Amphibious Vehicles; Jeeps; Misc—You buy direct now from U. S. Government Depots at fractions of Army & Navy costs—Send for Bulletin "Depot List & Procedure"—$1.00. Box 8-B, Sunnyside 4, N. Y.

EMBOSSED wings with your name on finest Calf; Silver or Gold; all military or civilian types. Polyvinyl protector included free. $1.25 each, three for $3.00 Tapco, P.O. Drawer 352 Water Valley, Miss.

AIRPORT, Slatington, Pa., sale or lease. Details by phone or mail. R. W. Morris, 103 E. Church St., Slatington, Pa.

NAMES And Addresses Of People Throughout The United States Interested In Aviation. Excellent Prospects For Aviation Products And Services. Guaranteed Accurate. For Complete Detail Write To: Fitzgerald (Chicago Division), Dept. A-20, 815 Countryside Drive, Wheaton, Illinois.

HOMEBUILT Designer Handbook: Formulas; Layout; Airfoils; Engines. $1.00. Homebuilt Airplane Directory: Photographs; Specifications—Experimental Biplanes, Lightplanes, Racers. $1.00. San Urshan, Box 4332, N.P. Station, San Diego 4, California.

BIG Discounts: Tools, Hardware, General Merchandise. For delivered price, specify needs. Landseair, 4730 North Racine, Chicago 40.

ASTRONAUTICS: Join the oldest rocket society in the United States with a continuously published magazine, $3.00 per year. United States Rocket Society, Inc., Box 271B, Pittman, Nev.

BUILDING Your Own Airplane is Easy with our New Simplified "Stits Playboy" and "Flut-R-Bug" Construction Blueprints. For Details (with Photographs, 3-View and Cut-away Drawings). Mail $1.00 to Stits Aircraft, Box 3084F, Riverside, California.

AEROBATIC Pilots! Detailed Inverted System Blueprints Illustrating Fuel, Oil, Smoke. $10.00. Practical Proven Methods. Stits Aircraft, Box 3084F, Riverside, California.

WILL trade 1958 model Karmann Ghia (Volkswagen) toward good four-place single engine aircraft. John Stanifer, General Delivery, Apple Valley, California.

OFFER your aircraft for sale world-wide through America's first aircraft brokers. Powers & George, 475 Fifth Avenue, New York 17, N. Y. Non-exclusive basis. Hundreds sold from $3000.

MISCELLANEOUS AIRPLANES FOR SALE

AERO COMMANDERS: 24 from $32,500. 1956 560A, ±XPFG/BF, has 295HP high compression engines with 400 hours. 7 place. Icebox. Bar. Closet. Beacon. Dare 360 channel VHF. Omnigator. ADF-12. Beautiful. Bargain. $48,500. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

BONANZAS: 32 from $7000. 1953, C-35, 225HP, ±QZJG/DF, has new 43-hour engine. Autopitch propeller. Auxiliary tank. Beacon. Gyros. Omnirange. ADF-12. Glidepath. Factory repainted, reupholstered 1957. Beautiful. $13,600. Also: 1955, F-35, ±RSGS/BF, with 30 hours SMOH. Automatic propeller governor. Auxiliary wing tanks. Oxygen. Gyros. Dual omnirange. ADF-12. Immaculate. $15,800. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 140A's All Metal: 7 available. 1950, ±RGZR/CF, has 300 hours SMOH. Metal propeller. Primary blind. Omnirange. Clean. Relicensed January. $3500. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 170's: 24 from $4185. 1955 painted 170B, ±GFZR/CF, has 375 hours. Beacon. Crosswind gear. Gyros. LF. Lear LTRA-6 VHF omnirange. Like new. Bargain. $6375. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 172's: 12 from $6875. Painted, 1957, ±JGGQ/AF, has 390 hours. Primary blind. Lear LF and VHF receivers. 2 VHF transmitters. Omnirange. Hangared. Undamaged. Excellent. $7695. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 180's: 14 from $8700. Painted, 1955, ±FPJX/BF, has 500 hours. Gyros. LF Omnigator. ADF-12. Hangared. Undamaged. Exceptional. Bargain. $9840. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 180 Amphibians: 6 from $14,140. Painted, 1956, ±FTTQ/AF, has 375 hours. Factory corrosion proofed. Lifting rings. Large nosewheels. Chromed slide tubes. Large oil cooler. New propeller. Beacon. Gyros. LF Omnigator. ADF-12. Hangared. Undamaged. $20,000. Beautiful. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 182's: 15 from $9850. Late 1956, ±RGZG/BF, has 278 hours. Gyros. LF. Omnigator, ADF-12. Hangared. Clean. $11,995. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

CESSNA: 195's: 14 available. 1950, ±QSQQ/DF, has zero 330HP Jacobs engine. Exterior, interior, and panel repainted. Reupholstered. Southwind heater. Gyros. Omnigator. ADF-12. Undamaged. $3500 spent recent maintenance. Exceptional. Bargain. $8000. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

MOONEY: Mark 20's: 4 from $9500. May 1957, ±RXFG/DF, has 320 hours. Auxiliary tank. Beacon. Gyros. Mark 2 Omnigator. RDF-1A. Extras. Like new. $12,000. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

NAVION: 35 available. Painted 1946, ±FRQT/KF, has new 300-hour 205HP engine. Controllable Aeromatic. Auxiliary tank. Gyros. Omnigator. ADF-12. Late modifications. Undamaged. Relicensed October. $5540. Also: 260HP, ±RQTQ/KF, with zero SMOH. New metal Hartzell. Wing-tip tanks. Beacon. Gyros. LF. Omnigator. Undamaged. Beautiful. $8950. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

RILEY: Navion Twins: 9 available. ±XZ/NF has 540 hours since conversion. 150HP engines. 80 gallons gas. Heavy gear. Beacon. Gyros. Lear Omnirange, ADF. Hangared. Relicensed November. Clean. Bargain. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

APACHES: 19 from $17,795. 1957, ±XQRT/PF, has 350 hours. Auxiliary tanks. 27 channel Simplexer. Lear omnirange. ADF-12. Like new. Bargain $26,900. Undamaged. Hangared. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

TRI-PACERS: 17 from $4100. 1955, 150HP, ±XGTF/PF, has 580-hour engine. Auxiliary tank. Gyros. 2 LF receivers. Dual VHF Omnigators. ADF-12. Undamaged. Clean. Bargain. $5800. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

STINSON: 20 from $3000. 1948 Station Wagon, ±TJT/CF, has 190HP Lycoming 160-hour engine, SMOH. Hartzell metal constant speed. Gyros. LF transceiver. LF receiver. VHF transceiver. Omnirange. Recovered completely 1956. Relicensed September. Hangared. Undamaged. Excellent. Bargain. $4000. Powers & George, 475 Fifth Avenue, New York 17, N. Y. "Exporting."

INDEX OF ADVERTISERS APRIL 1958

ADVERTISER	PAGE NO.
Acme School of Aeronautics	91
Adams Aircraft Sales, Inc., Jack	74
Aeronautical University	94
Aero Publishing Office	70
Air Associates, A Division of Electronic Communications, Inc.	79
Aircraft Finance, Inc.	88
Aircraft Radio Corporation	Third Cover
Air-Credit Sales Co.	88
Airport & Business Flying Directory	83
Air Research Institute	91
Airtex Products	92
All American Aviation Expositions, Inc.	81
American Airlines	25
American Flyers Incorporated	89
Amphibious Aircraft, Inc.	9
Atlantic Aviation Corporation	93
Aviation Photo Exchange	95
Aviation Service Corp.	79
Basch Co., George	86
Beech Aircraft Corporation	17
Bell Helicopter Corporation	7
Bendix Aviation Corporation	75
Bensen Aircraft Corp.	95
Bird Bombs	88
Boulevard Electronics, Inc.	95
Cerbini Laboratories, Inc.	76
Cessna Aircraft Company	58, 59
Champion Aircraft Corporation	68
Champion Spark Plug Company	12, 13
Conditional Sales Credit Corp.	77
Damschroder Sales Co.	85
Electric Auto-Lite Company, The	85
Electronic Experimenter's Handbook	90
Embry-Riddle Aeronautical Institute	69, 72
Esso Standard Oil Co.	Fourth Cover
Fielding Aviation Correspondence School	74
Flying Equipment Sales Co.	70
Flynn, Dr. John T.	79
Francis Aviation	94
Fruhauf Southwest Uniform Co.	89
Garrett Corporation, The	Second Cover
Glasco-Air	70
Gluckmann Aviation Company	84
Goodyear Aviation Products	55
Graubart Aviation, Inc.	76, 78
Gulf Aviation Products	21
Herter's Aviation Division	84
Indiana Technical College	86
International Telephone and Telegraph Corporation	16
Jeppesen & Co.	88
Jones Box Corp., Jesse	87
Kane Aero Equip't.	6
Krilar Company	82
Lakesites Land Co.	81
L T Labs	78, 79
Lockheed Aircraft Corp.	22, 23
Luminous Plastics, Inc.	84
McCauley Industrial Corporation	74
Meyer's Aircraft Co.	76
Mile-O-Graph, Inc.	86
Mooney Aircraft, Inc.	73
Mosher Manufacturing Company	82
Motorola	65
National Aeronautical Corporation	63
Navaids	86
Northrop Aeronautical Institute	20, 64, 87
Nova-Tech, Inc.	8, 66
Pan American Navigation Service	76
Parks College	80, 81
Personalized Neckwear	86
Phillips Petroleum Company	3
Pilots Employment Associates	89
Piper Aircraft Corporation	15
Professional Associates, Administrators	88
Puritan Compressed Gas Corporation	62
Pye Corporation of America	66
Republic Aviation (Helicopter Division)	18, 19
Ross Aero Publishers	93
Ross School of Aviation	93
Shannon Airport	89
Skycraft Design	62
Skymotive	94
Socony Mobil Oil Company, Inc.	11
Southwest Airmotive Co.	71
Spartan School of Aeronautics	67
Standard Oil Company of California	57
Stits Aircraft	86
Survival Equipment Company	94
Tactair Aircraft Products Co.	77
Tar Hotel, Jack	87
Time Sticks	94
U. S. Air Force	61
U. S. Sea & Air Photos	94
Van Nostrand Company, Inc., D.	5
Vest Aircraft Co.	90
Warner Instrument & Sales Company	84
Weems System of Navigation	94
White & Sons, Inc., W. O.	86
Zahns Airport	66
Zep Aero	86

Briefings . . .

(Continued from page 10)

out the country. Entitled "Experimental Light Aircraft & Midget Racers" (by John Underwood and John Caler) the book contains over 300 pictures of these planes with descriptive matter. Priced at $2.50, a directory of companies offering kits and plans is also included.

A SELF-CONTAINED, low-cost portable oxygen unit, especially adaptable to aircraft use where weight and space are a consideration, has been added to Air Associates' line of aircraft supplies and accessories. Called the Air Associates Oxygen Inhalator, and selling for $59.50, the unit consists of two oxygen cylinders, filling adapter, pressure-reducing valve, UL-approved pressure gauge and tee fitting, five-foot hose, breathing bag and mask. It operates by the turn of one valve. Total weight about nine pounds.

ELIMINATING the so-called "uncontrollable roll" so frequently encountered in DC-3 stalls is now possible through the installation of an Aileron Gap Strip Kit developed by the AiResearch Div. of Garrett Corp., Los Angeles. CAA-approved, the kit consists of specially designed aluminum strips which when fastened to the top trailing edge of a DC-3 wing closes the longitudinal opening between wing and aileron. Test flights indicate it reduces the stalling speed 7-8 mph; also increases operational safety in event of a "single engine go-around."

HERE IN THIS NEW 40 MILLION-dollar plant on the northeastern outskirts of San Diego, Calif. the ATLAS ICBM will be produced. Built by Convair (Astronautics) Div. of General Dynamics, the mas-

sive plant will be fully staffed and equipped within the next few weeks. Convair-Astronautics activities, bursting at the seams for some time, had previously been housed at other Convair facilities in San Diego.

SUPER ARCON, Lear's automatic rudder control, has been granted CAA certification with no limits as to phases of aircraft operation, during which it may be engaged. This means the Arcon may be utilized at any altitude above the ground and even during take-offs and landings. A safety device, the Super Arcon is also a navigational aid. The basis system uses an electric rate gyro for yaw sensing, and affords heading hold assist, especially for short term operations, such as localizer tracking. Initial CAA certification covers installation in the Piper Tri-Pacer, Piper Apache and Beech Bonanza models A-35 and H-35 inclusive.

IN A RECENT FLIGHT over Mexico City, a Helio Strato-Cruiser, high-altitude version of the four-place Helio Courier, set an official world's altitude record for light aircraft (up to 3,740 lbs) by climbing to 31,200 feet. Made in 50 minutes, the record has been certified by the FAI. Pilot-owner of the aircraft was Luis Struck, head of Servicio Aerotecnico of Mexico City. He was accompanied by Claudio Robles Ochoa, ass't. director of the Mexican Civil Aeronautics Department.

SALES HEADS of the Atlantic Aviation Corp., at recent Beech sales meeting in Wichita, Kan. sporting millionaire vests for sales records of $1 million each. Stewart M. Ayton, vice-president of sales

for the company had the pleasant job of congratulating the Atlantic Aviation trio (l to r) John M. Erskine, v.p., Boston Div.; Edwin J. Nilsson, sales mgr. Wilmington Div. and V. E. Larimer, v.p. New York Division.

JUST IN CASE you plan to build your own heliport—and more people are doing just that—Bell Aircraft will supply you with their very handy booklet "Guide For Establishing a Heliport." Of course, the heliports discussed just happen to have the Bell helicopter featured, but the brochure is full of useful information, applicable to all types.

INSTALLATION OF THE Tactair T-3 Autopilot on all models of the Piper Apache has met CAA approval. Approved with no operating limitations, the autopilot can be used on take-off, landing and during single engine operations. The T-3 permits the pilot to set the exact course he wishes to fly. Hooked up to elevator and aileron, it provides directional control through heading lock.

U.S. DEFENSE and Commerce Departments have entered into an agreement relating to the joint uses of certain facilities in the air traffic control and air defense systems. The object is to prevent duplication of facilities and equipment; prevent overlapping of function. Each department, however, is to maintain its separate identity, individual functional integrity and management.

AN ENGINEERING STAFF of 30 is engaged in designing new aircraft for Piper in the company's new engineering building at Vero Beach, Fla. This unit is the first completed at Piper's 40-acre Devel-

opment Center at Vero Beach. Engineering test flights of new models will be made at the nearby municipal airport. Piper's new facility is in addition to its major engineering and production program at Lock Haven, Pa.

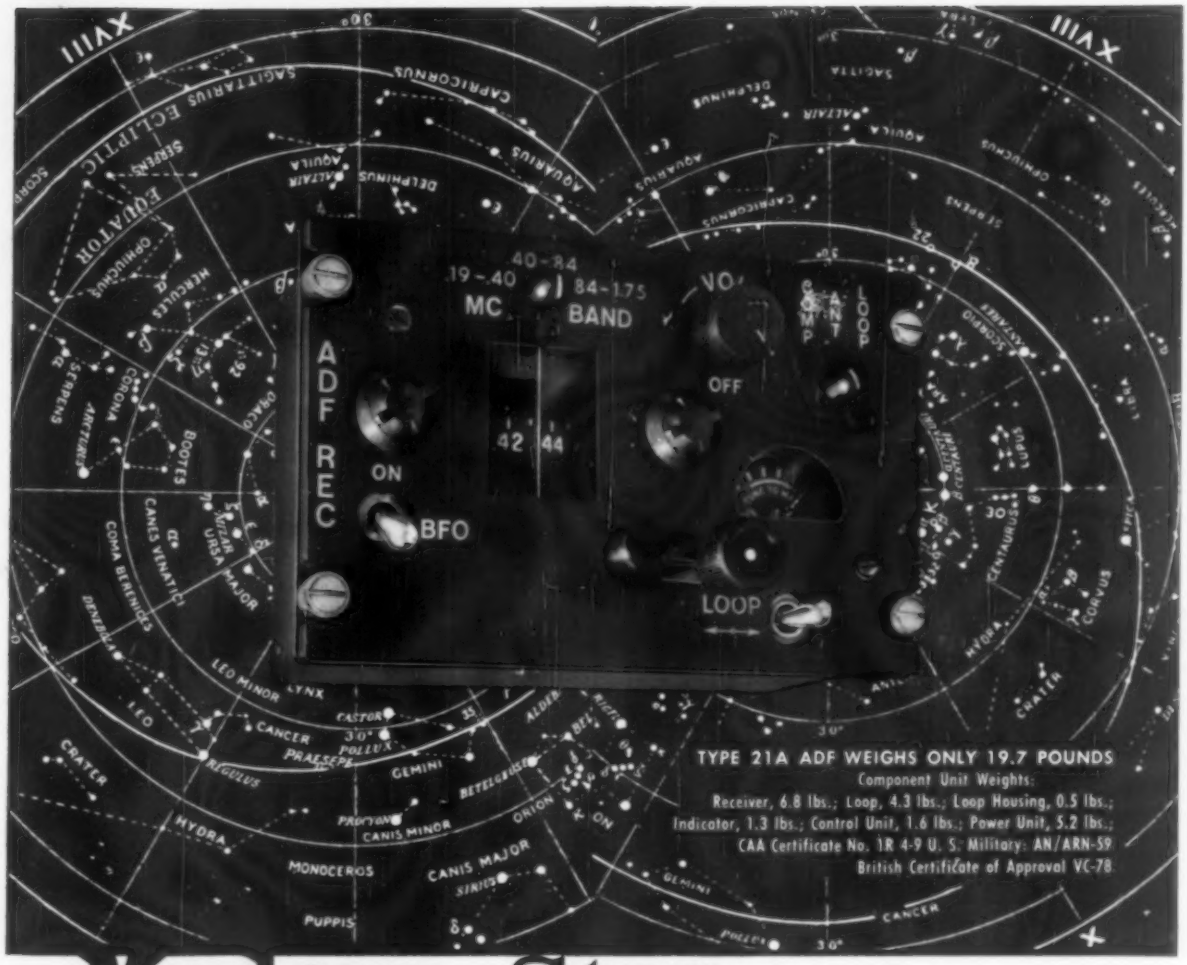
RECENT ADDITIONS to the Wright Airborne Electronics (Kansas City, Mo.) line of "Executive" tranceivers is a 60-channel unit, the Executive 60, and a 90-channel unit, the Executive 90. The "60" sells for $695 and the "90" for $795, complete with crystals, cable and antenna. Outstanding features for these transistor-powered units designed for light, medium and executive aircraft are the small size (4¾ in. x 6½ in. x 9¾ in.) and weight (less than six pounds).

AFTER EXTENSIVE TESTS in both laboratory and field, Cerbini Laboratories, Inc., of New Rochelle, N.Y. are marketing a plastics cleaner which is said to be non-crazing; does not scratch, soften or distort plastic surfaces; is anti-static and non-flammable. The company reports light plane owners and fixed base operators have reported most favorably on the product. Price is $2 postpaid for ½ pint. Order through P.O. Box 2029, Grand Central Station, New York City.

HELICOPTER AIRLIFTING of more than 100 tons of heating and ventilating equipment to the 13-acre roof of Convair's new ATLAS missile factory building resulted in savings of thousands of dollars and many working days. The work was done over a week-end by Rotor-Aids, Inc., helicopter operators of Ventura, Calif. Here the heavy-duty Sikorsky lets down a 3,400-lb. heating unit, one of 38 such units, which it had picked up from the factory grounds and airlifted to the roof.

BOTH RAILROADS AND BUSLINES bowed last year to the nation's airlines in passenger-mile traffic, according to a report from CAB. The airlines hop-scotched the railroad total by spring, and logged more intercity passenger miles than buses before the year's end. Airline passenger miles, scheduled and non-scheduled, added up to 25.8 billion; intercity bus travel to 25.2 billion; and railroad passenger miles to 21.6 billion.

PRINTED IN U.S.A.



Modern Star

For World-Wide Aircraft Navigation

ARC's TYPE 21A AUTOMATIC DIRECTION FINDER

Because it can be tuned to some 60,000 transmitters, spread all over the world, the ADF is a widely used navigation aid. Important news about the ADF, however, is that ARC has engineered this basic instrument down to less than 20 pounds in weight, with a comparable saving of space.

Now pilots enjoy the advantages of dual installations of this compact miniaturized equipment in tolerable weight and space requirements.

The ARC Type 21A ADF is built to today's more critical speed and environmental demands. It has hermetic sealing of vital components, such as the entire loop assembly. It covers all frequencies from 190 kc to 1750 kc . . . operates on only 2.8 amps at 27.5 volts dc input or equal power at 13.5 volts. A significant feature is the extremely low loop drag — only two inches outside the aircraft skin.

Ask your dealer for detailed literature.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation BOONTON, N. J.

30 YEARS OF ACHIEVEMENT IN AIRBORNE ELECTRONICS 1928 ARC 1958

OMNI/LOC RECEIVERS • MINIATURIZED AUTOMATIC DIRECTION FINDERS • COURSE DIRECTORS • LF RECEIVERS AND LOOP DIRECTION FINDERS
UHF AND VHF RECEIVERS AND TRANSMITTERS (5 TO 360 CHANNELS) • INTERPHONE AMPLIFIERS • HIGH POWERED CABIN AUDIO AMPLIFIERS
10-CHANNEL ISOLATION AMPLIFIERS • OMNIRANGE SIGNAL GENERATORS AND STANDARD COURSE CHECKERS • 900-2100 MC SIGNAL GENERATORS

TINY TOWN OR MIGHTY METROPOLIS *Esso is there . . . at 600 airports from Maine to Texas!* Leave it to those Esso Aviation Dealers . . . to give your plane the knowing kind of service it needs to keep you right on schedule. With an Esso Aviation Credit Card (they're easy to apply for), you can charge almost anything—including gasoline, oil and lubrication (you can't beat those Esso Aviation products) and even tire and battery service, landing fees, overnight in-transit storage and minor emergency repairs. How's that for a good deal?

FREE TO PILOTS! For your free Esso Flight Calculator, handy guide in figuring True Course, Drift Angle and Ground Speed, be sure to see your nearest Esso Aviation Dealer.

ESSO